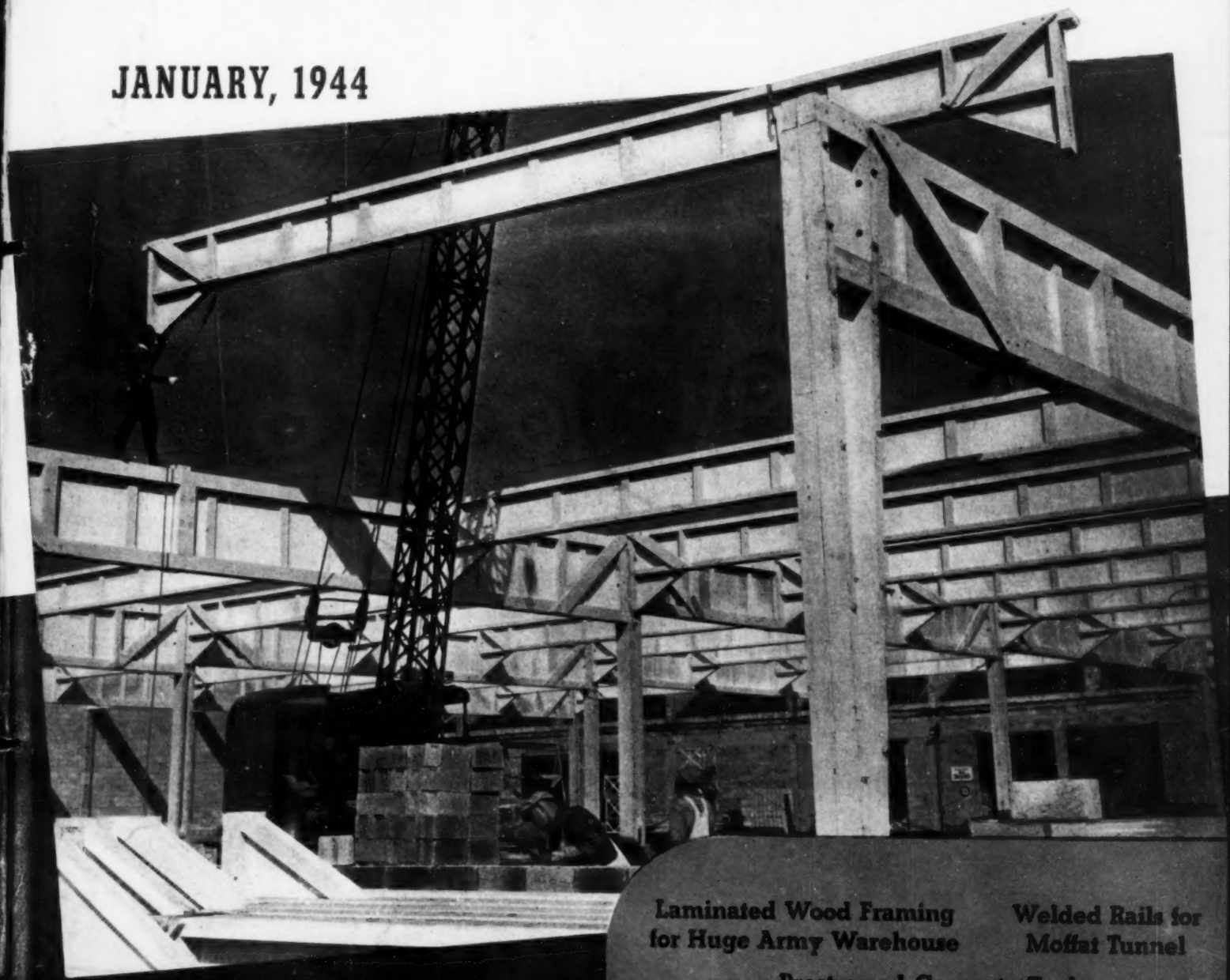
A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

PUBLIC LIBRARY
TECHNOLOGY DEPT

McGRAW-HILL PUBLISHING COMPANY, INC. • PRICE 20 CENTS

JANUARY, 1944



BIG ARMY WAREHOUSE *has framing of built-up plate girders and columns with plywood webs and laminated lumber flanges.*

Laminated Wood Framing for Huge Army Warehouse

Welded Rails for Moffat Tunnel

Prestressed Concrete Tanks

Traveling Scaffolds Erect Navy Blimp Hangars

Absorptive Lining for Dam Forms

R V. 26' Ja-De 1944

INLAND
Steel Sheet Piling

•

Wide range of sections

•

Special analysis for extreme strength

•

Free driving, yet water-tight under pressure

•

Corrosion resistant

ARMY E NAVY

INLAND STEEL CO.
38 S. DEARBORN ST.
CHICAGO, ILL.

SALES OFFICES

MILWAUKEE DETROIT
ST. PAUL ST. LOUIS
KANSAS CITY

Tech

TECHNOLOGY DEPT.

PAPER PACKS A WAR PUNCH . . . DON'T WASTE IT!

Ammunition, weapons, food and, of course, precious blood plasma, reach our boys in the front lines in perfect condition. Why? Because practically every one of the 700,000 different items shipped overseas is protected by paper! Paper also does an important job in war production, taking the place of even more critical materials. Paper packs a terrific war punch. Paper is a victory essential. It's up to all of us, then, to help conserve paper. When you finish reading this copy of CONSTRUCTION METHODS pass it along for others to read. Make your writing paper stretch. While shopping, help your storekeeper save paper by not asking for useless or double wrapping for your purchases. Back up the manufacturers' efforts to save paper by cheerfully accepting simpler wartime packaging. And be sure to save every bit of used paper for your local paper salvage drive.

CURRENT JOBS

. . . and Who's Doing Them

BUILDINGS

Public—Army contract for powder manufacturing plant addition in Kansas went to **William S. Lozier, Inc.,** of Rochester, N. Y., and **Broderick & Gordon,** of Denver, Colo., for more than $13,000,000. Alcohol plant in Missouri will be constructed by **Sanderson & Porter,** of Kansas City, for an estimated $4,000,000. **Geo. A. Fuller Co.,** of Chicago, Ill., has $3,000,000 contract for synthetic rubber tire plant in Alabama. Manufacturing facilities in Virginia will be expanded by **Laburnum Construction Corp.** of Richmond, and **Riggs Distler & Co., Inc.,** of Baltimore, Md., for $2,750,000. **Monson Bros.,** of San Francisco, Calif., has $2,414,091 Navy contract for hospital at San Leandro. Another Navy contract for $2,105,800 service school group in Idaho went to **C. F. Davidson Co.,** of Tacoma, Wash.

Commercial—Family dwelling units at Middle River, Md., will be built by **M. Shapiro & Sons,** of New York, N. Y., for an estimated $3,600,000. **Thos. Mullan & Sons,** of Baltimore, Md., has $1,547,000 contract for apartment buildings at Middle River. **Allied Contractors, Inc.,** of Los Angeles, Calif., will build dwellings for $1,500,000. **Frank W. Sharp Construction Co.,** of Houston, Tex., will build dwellings for $1,500,000. **Worsham Bros. Construction Co.,** of Knoxville, Tenn., has $1,000,000 housing contract.

HEAVY CONSTRUCTION

Contracts for natural gas pipeline from Texas to West Virginia were awarded to **Williams Bros. Corp.,** of Tulsa, Okla., for $13,000,000; to **Brown & Root, Inc.,** of Corpus Christi, Tex., and **W. E. Callahan Construction Co.,** of Dallas, for $2,500,000; to **N. A. Saigh Construction Co.** of San Antonio, for $2,400,000, and to **Bechtel-Dempsey-Price,** for $7,500,000. **Peter Kiewit Sons Co., McDougall Construction Co.,** and **Western Contracting Co.,** of Sioux City, Ia., have $1,700,000 Army contract for improvements in Texas.

HIGHWAYS

Among recent highway contract awards are the following: California: $217,719 to **A. E. Downer,** of Stockton; and $259,595 to **C. C. Wood,** of Lodi. Ohio: $540,082 to **Mauger Construction Co.,** of Columbus; $303,396 to **A. J. Baltes, Inc.,** of Norwalk; and $300,000 to **W. L. Johnson,** of Hicksville. Oklahoma: $518,645 to **Condon & Cunningham** and **Paul B. Reis Co.,** of Omaha, Neb. Texas: $900,000 to **Bethlehem Steel Co.,** of Bethlehem, Pa. Virginia: $232,014 to **W. H. Scott, Inc.,** of Franklin. Quebec: $1,500,000 to **H. J. O'Connell, Ltd.,** of Montreal.

CONSTRUCTION METHODS was founded in 1919, under the name of SUCCESSFUL METHODS, by the Manufacturers Publicity Bureau, Inc., of Chicago, representing a group of non-competing manufacturers of construction equipment. Charles R. Thomas, editor of the first few issues, was succeeded by William Jabine.

In 1926 the McGraw-Hill Publishing Company, Inc., of New York, purchased the publication, changing its name to SUCCESSFUL CONSTRUCTION METHODS in November of that year, to CONSTRUCTION METHODS in May, 1927, and to CONSTRUCTION Methods and Equipment in December, 1936. In October, 1939, the name CONSTRUCTION METHODS was resumed.
All rights to the foregoing titles are reserved by the publishers.
Robert K. Tomlin was appointed editor of CONSTRUCTION METHODS in January, 1928. Vincent B. Smith is associate editor; N. A. Bowers, Pacific Coast editor; Nelle Fitzgerald and Patricia McGerr, assistant editors, and Paul Wooton, Washington representative.

Copyright, 1943
Established 1919

McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York (18)

Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

JOHN ABBINK, Publisher

ROBERT K. TOMLIN, Editor — A. E. PAXTON, Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington)
N. A. Bowers (San Francisco) Nelle Fitzgerald
Patricia McGerr

JANUARY, 1944

The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the folloowing references are to articles or illustrations in this issue that tell:

How **PENICILLIN PLANT** was rushed to completion on 88-day schedule. —p. 47
How **WOODEN LANDING BOATS** for invasion troops were built on assembly line. —p. 48
How **ARMY WAREHOUSE** was framed with laminated I-section timber members. —p. 50
How **SPLIT-RING CONNECTORS** were used in end posts of longitudinal girders. —p. 51
How **PRESSURE GROUTING** stabilized railway roadbed. —p. 53
How **CONVEYOR BELTS** hauled clay for world's highest earthen dam. —p. 54
How **TRAVELING SCAFFOLDS** were used to erect timber blimp hangars for Navy —p. 56
How **TIMBER BOX GIRDER** was erected with aid of steel-frame bay temporarily attached to traveler. —p. 58
How **PACK MULES** carry oil drums needed in construction of Inter-American Highway. —p. 59
How **MERRY-GO-ROUND MACHINE** applied high-tensile steel wire to prestressed concrete tanks. —p. 60
How **MADERA CANAL** is being extended and siphon built at river crossing. —p. 63
How **ARMY ENGINEERS** received training in rescue and defense work in fighting Midwest floods. —p. 64
How **ABSORPTIVE FORM LINING** in flexible sheets is stapled to panel forms at Norfork Dam. —p. 66
How **PANEL FORM** for downstream face was anchored at base and supported. —p. 67
How **CAMOUFLAGE TECHNIQUES** for passive defense are developed by Army Engineers. —p. 69
How **THREE-HINGED CONCRETE ARCH RIBS** were precast in flat position to support arch roof. —p. 70
How **STEEL GUARDS AND WHEEL DISKS** protect tires of lumber carriers in shipyard. —p. 72
How **BLOWER** provides fresh air for welders inside steel water main. —p. 73
How **NEW HEAVY-DUTY RAIL** was welded in 1,000-ft. sections and skidded into Moffat Tunnel. —p. 76

McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y.

JAMES H. McGRAW, Founder and Honorary Chairman

Editorial and Publishing Offices: 330 West 42nd St., New York (18); 520 North Michigan Ave., Chicago (11); 68 Post St., San Francisco (4); Aldwych House, London, W. C. 2, England. Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Los Angeles; Atlanta, Ga.

JAMES H. McGRAW, JR., President — **HOWARD EHRLICH**, Executive Vice-President — **MASON BRITTON**, Vice-President — **CURTIS W. McGRAW**, Vice-President and Treasurer — **JOSEPH A. GERARDI**, Secretary — **J. E. BLACKBURN**, Circulation Manager

CONSTRUCTION METHODS, January, 1944. Volume 26. Number 1. Published Monthly, price 20¢ a copy. **Return Postage Guaranteed.** Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York (18), N. Y. **Subscription rates**—United States, Mexico and Central and South American countries, $1.00 a year, $1.50 for two years, $2.00 for three years. Canada, $1.50 a year, $2.50 for two years, $3.00 for three years. Great Britain and British Possessions 12 shillings a year, 36 shillings for three years. All other countries $2.00 a year, $6.00 for three years. Entered (or reentered) as second class matter December 16, 1936, at the Post Office of New York, N. Y., U. S. A., under the act of March 3rd, 1879. Printed in U. S. A. Cable address: "McGrawhill, New York." Member of A. B. P. Member of A. B. C. Contents copyrighted 1944 by McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York, (18), N. Y.

CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

From .....

.....

To .....

.....

Signed .....

Reconversion *and* Contract Termination

AMERICAN industry is dedicated to an all-out effort to achieve victory, and its good faith in this direction is amply demonstrated by the results.

American industry also is dedicated to making democracy work effectively after the victory. And it is toward this objective that industry must prepare itself to guide the processes of demobilization and reconversion in order to minimize the dislocations and chaos which too easily can result from so tremendous a task.

We exercised foresight from the very beginning of the war mobilization program. Let us now exercise foresight in the approaching changeover from a wartime to a peacetime economy.

The first step in converting American industry from military to civilian production is the termination of contracts between the government procurement agencies and the producers. There are now in force war contracts amounting to tens upon tens of billions of dollars. As the demand for weapons of war decreases, the Armed Services will undertake to cancel contracts. With the emphasis shifting from weapons of one category to weapons of another category, many billion dollars worth of contracts already have been terminated. It is hoped that the experience now being gained in this work will provide the basis for effective and sound procedures when an avalanche of cancellations comes later.

Many complex problems involved in the termination of contracts will materially influence the success of the entire reconversion program. Once war demands fall off sufficiently to permit the renewal of civilian production, we will have to act with great speed if we are to avoid large-scale unemployment. Prompt financial settlements of contracts and the rapid clearance of plants are of immediate and great significance. In many cases the removal of equipment and raw materials will be more important than money payments. The allocation of raw materials for civilian production will be of paramount importance.

Government agencies obviously must exercise great care in spending the people's money and in protecting the interest of the public against excessive payments. Unjust enrichment at the expense of the people will not be condoned nor will it reflect favorably upon management to present inflated claims. But long-delayed negotiations, which will retard the initiation of civilian production, likewise must be avoided.

The contracting agencies and the manufacturers both know that the greatest losses in the reconversion period will result from delays in getting peacetime production under way. The greatest potential wastes lie in unemployment and in idle plants. The magnitude of such losses to the public can be far greater than the money spent in liberal settlements; to the manufacturer, these losses can represent vastly more than the extra funds that might result from interminable litigation. Polices must be firmly established *now* whereby the manufacturers, including sub-contractors and suppliers, will receive substantial settlements immediately in order that ample funds be available for reconverting plants and accumulating necessary inventories of peacetime goods. Nor must we overlook the fact that the uncertainty of long drawn-out disputes will have a stifling effect on enterprise and that final settlements, therefore, should be made as promptly as possible.

Plants that are equipped largely with special war-time tools and machines and that are fully stocked with materials, components, and finished military products will not be able to undertake any substantial degree of conversion until this machinery and this inventory are removed. Advance arrangements are essential for the prompt clearance of great numbers of plants the country over. Adequate warehousing facilities must readily be available so that the changeover to civilian production will not be hampered.

As war demands decline, civilian output will be resumed; and while we recognize that the demands for munitions must vary as the strategy of the military leaders is changed, it is hoped that the Armed Services already have or soon will develop schedules of their continued needs under different strategic assumptions. If we know in advance the probable curtailment in war requirements we are in position to estimate the timing and the quantities of raw materials, the number of workers, and the industrial facilities that will be available for peacetime purposes. It will then be possible to integrate the lifting of restrictions on civilian production with the drop in war production.

Needless unemployment and idle plants will prevail if restrictions on the output of civilian goods are removed at a slower rate than available manpower, materials and plants permit. On the other hand, if the controls on civilian production are removed prematurely or too freely, then the production of military requirements will be hampered correspondingly. There will be great clamor and pressure for eliminating all restrictions as soon as any measurable quantity of materials and numbers of workers are freed from war work. It will react adversely on industry as well as on government if these pressures are heeded indiscriminately, thereby retarding the production of munitions for our boys who still will be fighting and dying at the front. The coordination of declining war demands with increasing civilian production probably is the most difficult and at the same time the most important task in our entire reconversion problem. Advance planning and sound judgment are essential.

An order of priority for initiating non-war or civilian production must be prepared beforehand. The schedule of resumption of peacetime production should be governed by the amounts of materials, manpower and facilities that are available as well as by the relative needs or importance of different products. There will be strong competition for priority among the various kinds of consumer goods, equipment needed for reconversion, producers goods required for expansion and modernization, and export demands. Relative need obviously is the most compelling criterion. But because of the importance of expediting reconversion, earliest consideration is urged for the tools and fixtures and models which will expedite large-scale civilian production when adequate labor and materials are available. In any case, advance schedules will be needed to avoid a makeshift, piecemeal lifting of controls on the basis of who shouts the loudest.

Another difficult problem of the reconversion period will be to keep to a minimum the distortion of inter-industrial and intra-industrial relationships. Many varieties of consumers goods compete for the consumer dollar, and some industries will offer strong resistance if the green light is given first to industries whose products may thereby acquire a time advantage.

Even more difficult will be the matter of competition between companies producing the same products. Some manufacturers may find themselves tied up with continuing war contracts with restrictions on their peacetime products suddenly lifted and their competitors free to take advantage of the situation. The declining need for different kinds of war materiel will vary greatly, and some producers inevitably will be available for peacetime production considerably in advance of some of their competitors.

This raises the question of victory models or nucleus plants to eliminate competitive advantages among producers of identical products pending the time when all are on an equal footing again. Policies controlling this should take into account the degree or the extent of competitive advantage which reconversion might bring, and also upon the time interval during which these advantages will prevail. Such programs necessarily mean increased government control, hence they should be adopted only under the most pressing circumstances.

There is the important question of termination as between large and small plants. Fairness must be exercised, and undue advantage to either group must be avoided in extending opportunities to continue receiving profitable war orders or in getting back into civilian production. The problems of small manufacturers must not be neglected in this period. Likewise, any restraints on new ventures and on more vigorous competition must meticulously be avoided.

There is also the question of communities which have been greatly enlarged and others which actually have been brought into being by the war. It might be advisable to terminate contracts in these areas first in order that the workers might be encouraged to migrate elsewhere while employment prospects are most favorable. Also, if continued production of some armaments is contemplated after the war, it might be well to concentrate this production in communities which otherwise would be stranded.

If the process of terminating contracts is to be geared into meeting continued demands for munitions and also expediting reconversion, then the Armed Services must accept broad policy considerations as criteria for cancelling contracts. Procurement officers might be inclined to cancel contracts with all high cost producers first. Or they might be inclined to cancel small producers first so as to reduce the administrative burden. Then again, they might cancel the newer producers of specific products rather than the older, time-tried manufacturers.

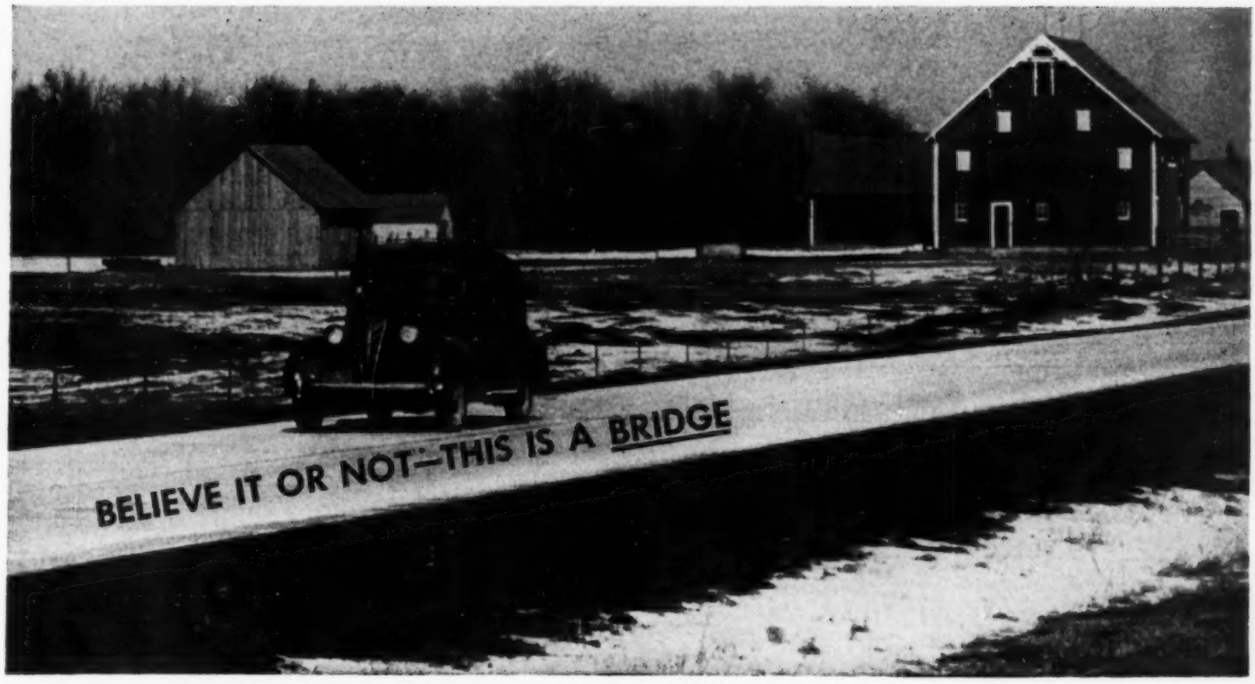
These procurement criteria may all be highly desirable and efficient but other important considerations such as those mentioned above must be given proper attention. *Demobilization cannot be a separate process from reconversion.* They must be united. The termination of contracts is a demobilization task, but I am confident that the procurement agencies appreciate the importance of this operation in facilitating reconversion and that they will take full cognizance of the policies necessary for giving every assistance to initiating peacetime production.

I have not attempted to raise all the important policy questions in terminating contracts, nor do I propose specific solutions for each major problem. Rather it has been my purpose to indicate the complexities of the task which faces us and to urge that intelligent and sound plans be developed now while there is time. By so doing, we can avoid the dislocations and economic disorder which otherwise might characterize the reconversion period. The better we are prepared, the more rapid will be the resumption of full employment and good business after the war is won.

The job of changing America's industrial pattern from war to peace speedily and efficiently is one which will tax the talents and knowledge of the ablest business men of the country. These men can, and I am sure that they will, attack this task with the same energy and determination that characterized their efforts in the period of mobilization for war.

Industry advisory committees were established to cooperate with governmental agencies in the great task of conversion to a full war economy. These committees are the means through which industry has the opportunity to play a major role in the solution of the problems of reconversion. It must assume that responsibility or accept the consequences in the form of enforced government control. Industry must take a renewed interest in these committees and make certain that our best minds and strongest men are available for the challenging job of conversion which we face now. It is a job that must be done well if we are to have a good start on the road to a greater democratic and free enterprise nation.

President, McGraw-Hill Publishing Company, Inc.



'INCOR' CUTS WINTER PAVING COSTS

DEPENDABLE 'Incor' high early strength helped lick cold-weather problems on U.S. 31, 14 miles south of Kokomo, Ind. This strip of highway looks like any other well-built concrete slab, but actually it is a bridge, constructed over a muck-pocket. Put fill and paving over this muck and the soft sub-surface oozes out from under. Indiana State Highway Commission's solution was simple and direct:

> The old pavement was broken up and grade corrected. Monotubes were driven to refusal at 20- to 65-ft. depth, filled with concrete and capped. Then concrete slabs, bearing on the bents, were placed directly on the fill . . . an invisible bridge of 32 spans, total length 583 ft., with the 22-ft. concrete roadway extending 380 ft. beyond bridge limits.

Selective concreting helped Gradle Brothers, Inc., Carmel, Ind., obtain maximum job speed at minimum cost. Lone Star Cement was used in piling and capping . . . 'Incor' 24-Hour Cement in approach slabs and bridge paving, eliminating need for heated enclosures in cold weather and advancing completion by weeks. Typical 'Incor'* service in highway work . . . initial economies matched by outstanding performance under heaviest traffic on the nation's busiest roads and streets.

*Reg. U. S. Pat. Off.

USE 'INCOR'—TIME-SAVING MEANS DOLLAR-SAVING

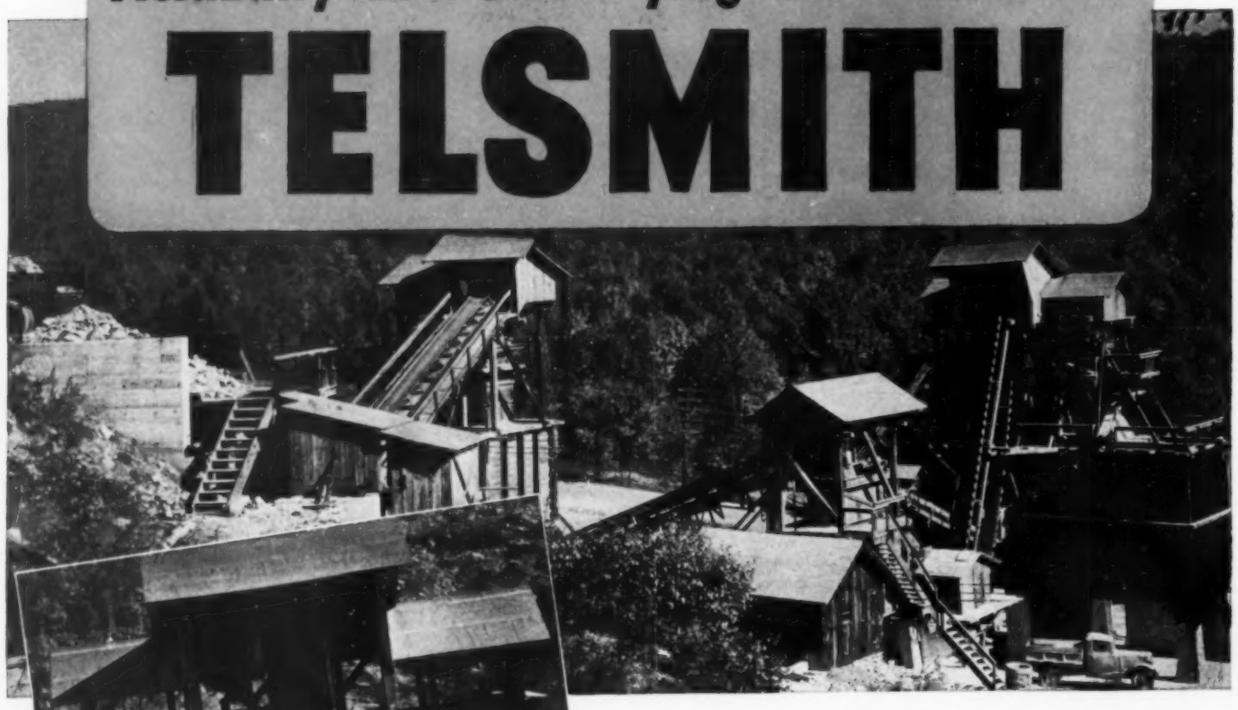
LONE STAR CEMENT CORPORATION

Offices: ALBANY · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · HOUSTON · INDIANAPOLIS · JACKSON, MISS.
KANSAS CITY · NEW ORLEANS · NEW YORK · NORFOLK · PHILADELPHIA · ST. LOUIS · WASHINGTON, D. C.

LONE STAR, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS . . 15 MODERN MILLS . . 25-MILLION BARRELS ANNUAL CAPACITY

Flexibility—to meet varying wartime market

TELSMITH



1 & 2 Two Telsmith 3′ x 10′ Triple Deck Pulsators (sizing screens)

3 Telsmith 4′ x 10′ Triple Deck Pulsator (scalping screen)

4 Telsmith 36″ Gyrasphere Secondary Crusher

Q-10

Closely co-operating with the operators in designing this crushing plant . . . the newest in Pennsylvania's anthracite region . . . Telsmith engineers again demonstrated their "know how" ability. For Banks Stone & Sand Co., Scranton, Pa., the operators, this is their third Telsmith-designed plant.

This West Mountain plant is on a large sandstone deposit, six miles from Scranton. Its product market is wide and varied—with defense plant and mining projects, municipal and state needs to be served—all with different requirements.

Such a market demands a plant with a high capacity, yet one that can turn out quality specification products. Ample stock pile areas had to be created. And the high quarry level and side hill topography of the location utilized to the best advantage.

That's just the kind of a job Telsmith Balanced Plant Service is organized to do. That's why and how this plant turns out 100 tons per hour . . . and reduces a high percentage of it into chip sizes. And it has real flexibility . . . making several specification products at one time.

The plant contains the following equipment by Telsmith: 36″ x 12″ Telsmith Heavy Duty Apron Feeder; 4′ x 12′ Telsmith Triple Deck Pulsator (scalping screen); 4′ x 10′ Telsmith Triple Deck Pulsator (scalping screen); 36″ Telsmith Gyrasphere Secondary Crusher; No. 7 Telsmith Belt Elevator, with 52′ centers; two 3′ x 10′ Telsmith Triple Deck Pulsators (sizing screens).

For Telsmith service and equipment guide, get Bulletin 10.

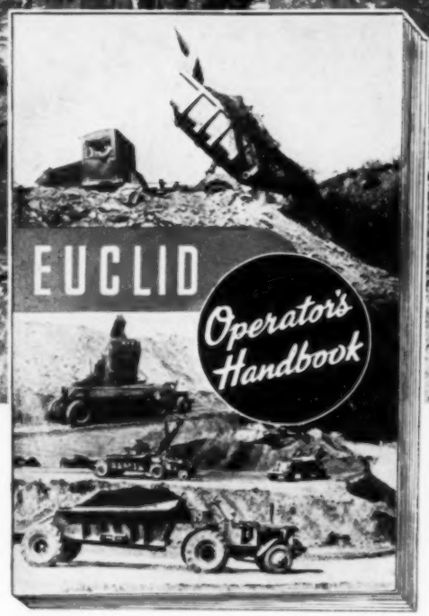
SMITH ENGINEERING WORKS, 510 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

Room 1604—50 East 42nd St. New York 17, N.Y. | **211 W. Wacker Drive Chicago 6, Ill.** | **713 Commercial Trust Bldg. Philadelphia 2, Pa.** | **19-21 Charles St. Cambridge 41, Mass.** | **G. F. Seeley & Co. Toronto, Ont.** | **Mines Eng. & Eqpt. Co. San Francisco 4—Los Angeles 14**

Brandeis M. & S. Co. Louisville 8, Ky. | **Charleston Tractor & Eqpt. Corp. Charleston 22, W. Va.** | **Roanoke Trac. & Eqpt. Co. Roanoke 7, Va.** | **Clift L. Priester 911 S. 3rd St., Memphis, Tenn.** | **Wilson-Weesner-Wilkinson Co. Knoxville 8 and Nashville 6, Tenn.**

"KNOW HOW" HELP FOR EUCLID OPERATORS



THIS CONVENIENT HANDBOOK for operators of Euclid equipment contains illustrations and information that will be of real help in preventing unnecessary breakdowns and resulting production delays. If you have not received a copy, your Euclid distributor or our factory Service Department will fill your request promptly.

● The new Euclid Operator's Handbook is a handy reference of complete data for proper care and efficient operation of both Rear-Dump and Bottom-Dump EUCLIDS. Its many charts and illustrations, as well as the easily understood suggestions and instructions provide "basic training" for new owners and operators.

Since most of the illustrative material and much of the information has not been available previously in other literature, the handbook will also be helpful to experienced operators of Euclid equipment. By making this "know how" information accessible to every Euclid operator, we hope to help keep your "Eucs" rolling longer.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE

NEW

Thor

MEDIUM WEIGHT
PAVING BREAKER
No. 23

HERE'S A BREAKER THAT'S A BONUS MAKER

Although a medium weight machine, the new Thor No. 23 Paving Breaker delivers a blow as powerful as many a heavy weight and is as easy to handle as many a light weight machine. This has been accomplished by the incorporation of the most recent advancements in paving breaker design, including a new block type piston hammer that greatly increases foot pound blows . . . reduction of vibration through perfect balance . . . a remarkably cool handle . . . and easy riding qualities that allow the operator to perform more work with less fatigue.

DEMOLITION

The new No. 23 Breaker turns out a remarkable day's output in tearing up concrete, brick, and asphalt pavements, and on other types of demolition.

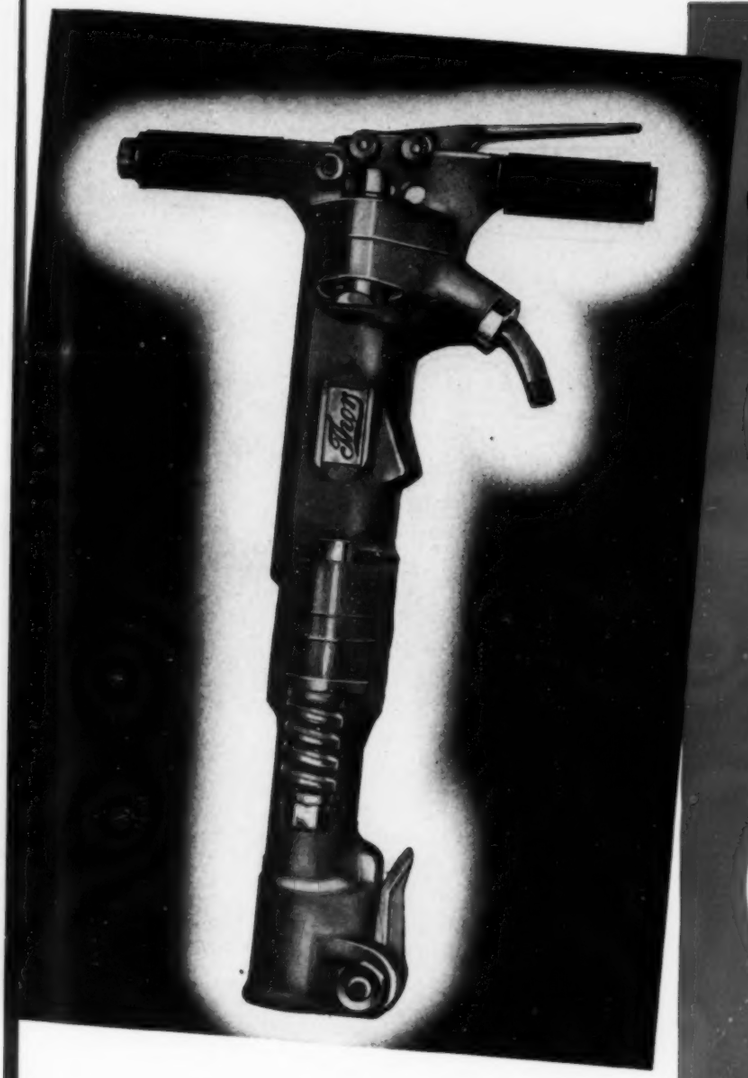
WALL OPENING

The No. 23 is particularly useful where the breaker must be lifted and maneuvered constantly. Its light weight and perfect balance make it surprisingly easy to handle.

SCORES OF OTHER JOBS

The No. 23 can be used, with the proper tools, on countless other jobs—spike driving, digging, and the like. It turns out more work because it delivers surplus power.

OTHER THOR AIR TOOLS: ROCK DRILLS, CLAY DIGGERS, SUMP PUMPS, GRINDERS, SAWS AND ACCESSORIES



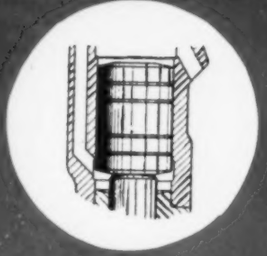
Extra POWER-EXTRA OUTPUT-EXTRA PROFIT FROM THESE FEATURES!

NEW LATCH RETAINER

Simple and efficient in operation. A spring detent holds the latch retainer in a closed position. Pressing with the foot releases the tool. No adjustment is required during insertion of the tool. The steel retainer bolt is supported in the front head by two renewable steel bushings.

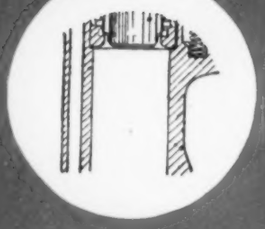
BACK HEAD

Made of drop forged, heat treated alloy steel. Equipped with rubber grips that keep the handle cool at all times. The special design maintains rigidity between the back head and cylinder, eliminating excessive bolt breakage and leakage when machine is used for prying.



PISTON HAMMER

A block type piston hammer of special selected steel, hardened and ground, with four oil grooves for lubricating the cylinder walls. Extra length provides abundant wearing surface and prevents scoring of piston or cylinder walls. Piston is reversible, giving longer life.



CYLINDER

Designed to give full effect to each hammer blow. A dead air cushion in the front of the cylinder prevents the hammer from striking the tappet seat. A side exhaust port directs the exhausted air away from the operator.

SHORT FRONT HEAD

The No. 23 Paving Breaker can be furnished with a plain, short front head for use with 1⅛" or 1¼" plain shank Hexagon steel.

SPIKE DRIVER

The No. 23 Paving Breaker is available with a special front head for driving spikes up to 13" long.

SPECIFICATIONS

Bore of Cylinder	2¼"
Length Overall, Collared Steel	25¼"
Length Overall, Plain Steel	22½"
Length, Spike Driver	22½"
Weight, Collared Steel	59 lbs.
Weight, Plain Steel	55 lbs.
Weight, Spike Driver	55 lbs.
Size Steel Recommended	1⅛" or 1¼"x6" Shank Hex.
Size of Air Hose Recommended	Thor ¾"

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities

How to be sure of finishing ANY compressed air job

You're assured continuous operation—from the time your compressed air job is started until it is finished—when you use a Schramm compressor.

Here's why: They're rugged, sturdy air compressors, designed to handle with ease even the toughest jobs, and to take care of the variable maximum and minimum load, automatically, 24 hours a day!

Long-life mechanical features contribute to this performance: complete water cooling . . . mechanical intake valves . . . vertical piston travel and horizontal valve action . . . sturdy support for cylinder head . . . and forced feed lubrication.

Schramm provides heavy-duty, continuous operation with least attention, upkeep and operating costs. Match the speed of modern engines with this compressor.

For further details write for catalog 42-PA.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

CABLE control ... at its best!

Easy-to-reach controls. High leverage.
External clutches and brakes are big, cool running, smooth acting.
Two decks for mounting fairlead swivel sheaves for better performance on different classes of work.
Sheaves slue in excess of 180°.

BUCKEYE Power Control Units are fast —a touch of the control and the line sings into action. They take hold of the load smoothly and evenly with no jerks, and the sheaves are designed to minimize cable wear—you can use smaller, less expensive cable than with other winches having comparable line pulls. Big clutch and braking area plus external location means cool operation and long life. Center of line pull is low to maintain tractor balance and better traction. Controls are high leverage, within easy reach. You have your choice of Heavy Duty or Medium Duty, single or double, wide or standard drum, models. For all makes and models of tractors. Specification data on request.

WITH BUCKEYE CABLE CONTROL YOUR TRACTORS CAN DO MORE JOBS!

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

Convertible Shovels
Spreaders
Power Finegraders

Buckeye

Trenchers
Tractor Equipment
Road Wideners

KNOW YOUR

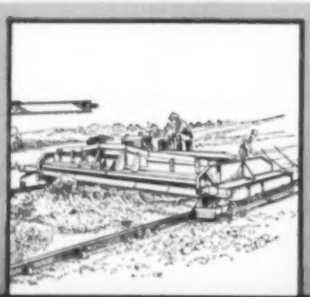
The family of Blaw-Knox Distributors covers every part of the United States and Canada. They employ mechanical and technical experts with a vast background of experience acquired through many years in the industry that will help you in the proper adjustment, repair, maintenance, lubrication, etc. of your Blaw-Knox Construction Equipment.

Many items of Blaw-Knox Construction Equipment are available for domestic users on essential projects — within limits of government regulations. Your Blaw-Knox Distributor will handle your inquiry promptly and efficiently.

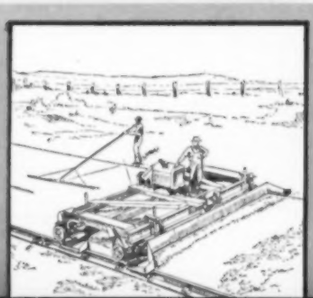
There is a Blaw-Knox Distributor near you — look him up and get to know him — he is ready to help you.

ARMY NAVY

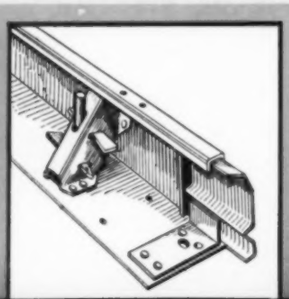
BACK THE ATTACK
WITH WAR BONDS AND STAMPS



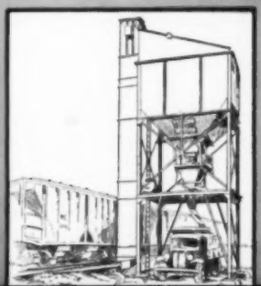
AIRPORT PAVING SPREADERS



AIRPORT FINISHING MACHINES



AIRPORT PAVING FORMS



BULK CEMENT PLANTS

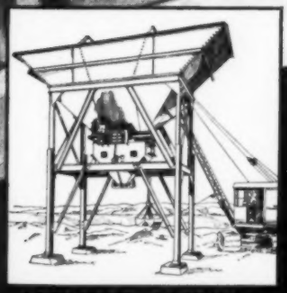
Many of the distributors listed below have represented Blaw-Knox for 20 years or more. All of them are leading construction equipment dealers in their respective territories.

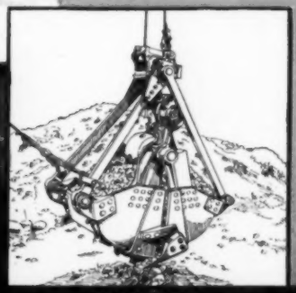
BLAW-KNOX DISTRIBUTOR!

ALABAMA
Birmingham — Young & Vann Supply Co
ARIZONA
Phoenix — State Tractor Equipment Co.
ARKANSAS
Little Rock — Lyons Machinery Company
CALIFORNIA
Los Angeles — Le Roi-Rix Machinery Co — E. M. Ornitz
San Francisco — C. H. Grant Company
COLORADO
Denver — Ray Corson Machinery Co.
CONNECTICUT
New Haven — W. I. Clark Co.
DELAWARE
Philadelphia, Pa. — Giles & Ransome
DISTRICT OF COLUMBIA
Washington — Matt A. Doetsch Mach. Co.
FLORIDA
Jacksonville — Florida Equipment Company of Jacksonville
Miami — Florida Equipment Company of Miami
Tampa — Epperson & Company
Birmingham, Ala. — Young & Vann Supply Co.
GEORGIA
Atlanta — W. C. Caye & Company
IDAHO
Boise — Intermountain Equip. Co.
Spokane, Wash. — Empire Equip. Co.
ILLINOIS
Chicago — O. T. Christerson Co.
Davenport, Ia. — Gierke-Robinson Co.
St. Louis, Mo. — O. B. Avery Company
INDIANA
Indianapolis, — Reid-Holcomb Co.
Chicago, Ill. — O. T. Christerson Co.
Louisville, Ky. — Brandeis Machinery & Supply Co.
IOWA
Davenport — Gierke-Robinson Co.
Des Moines — Herman M. Brown Co.
KANSAS
Kansas City — G. W. Van Keppel Co.
KENTUCKY
Louisville — Brandeis Mach. & Supply Co.
Columbus, Ohio — W. W. Williams Co.
LOUISIANA
New Orleans — Southern States Equipment Co.
MAINE
Portland — Stanley-Cadigan Company
MARYLAND
Baltimore — Henry H. Meyer Co., Inc.
Washington, D. C. — Matt A. Doetsch Machinery Co.
MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.
MICHIGAN
Detroit — Wm. P. Favorite Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply Division of Lakeshore Engineering Company
MINNESOTA
Duluth — Borchert-Ingersoll, Inc.
St. Paul — Borchert-Ingersoll, Inc.
MISSISSIPPI
Amory — Dalrymple Equip. Co.
New Orleans, La. — Southern States Equipment Co.
MISSOURI
Kansas City — G. W. Van Keppel Co.
St. Louis — O. B. Avery Company
MONTANA
Billings — Western Construction Equip. Company
NEBRASKA
Omaha — Anderson Equipment Co.
NEVADA
Los Angeles, Cal. — E. M. Ornitz
San Francisco, Cal. — C. H. Grant Co.
NEW HAMPSHIRE
Barre, Vt. — Casellini-Venable Corp.
Boston, Mass. — The Equipment Co.
Portland, Me. — Stanley-Cadigan Co.
NEW JERSEY
New York, N.Y. — R. E. Brooks Company
Philadelphia, Pa. — Giles & Ransome
NEW MEXICO
Albuquerque — Hardin & Coggins
NEW YORK
Albany — Larkin Equipment Co.
Buffalo — Trevor Corporation
Elmira — LeValley, McLeod & Kinkaid Co., Inc.
Endicott — Newing Motors Co., Inc.
New York — R. E. Brooks Company
Rochester — Keystone Builders Supply Co., Inc.
Syracuse — Syracuse Lumber Co.
Utica — McQuade & Bannigan, Inc.
NORTH CAROLINA
Raleigh — Carolina Tractor & Equip. Co.
Salisbury — Carolina Tractor & Equip. Co.
NORTH DAKOTA
Fargo — Dakota Tractor & Equipment Co.
OHIO
Cleveland — H. B. Fuller Equipment Co.
Columbus — W. W. Williams Co.
Pittsburgh, Pa. — Dravo-Doyle Company
OKLAHOMA
Oklahoma City — Leland Equipment Co.
OREGON
Portland — Contractors Equipment Corp.
PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company
RHODE ISLAND
Boston, Mass. — The Equipment Co.
SOUTH CAROLINA
Columbia — Jeff Hunt Road Machinery Co.
SOUTH DAKOTA
Rapid City — I. D. Evans Equip. Co.
TENNESSEE
Chattanooga — Nixon-Hasselle Co.
Knoxville — Wilson-Weesner-Wilkinson Co.
Nashville — Wilson-Weesner-Wilkinson Co
TEXAS
Dallas — Conley-Lott-Nichols Mach. Co.
Houston — R. B. Everett & Co.
UTAH
Salt Lake City — Lund Machinery Co.
VERMONT
Barre — Casellini-Venable Corp.
VIRGINIA
Roanoke — Roanoke Tractor & Equip. Co.
Baltimore, Md. — Henry H. Meyer Co., Inc.
Washington, D. C. — Matt A. Doetsch Machinery Co.
WASHINGTON
Seattle — L. A. Snow Company
Spokane — Empire Equipment Company
WEST VIRGINIA
Charleston — Charleston Tractor & Equip. Corp.
Pittsburgh, Pa. — Dravo-Doyle Company
WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co.
St. Paul, Minn. — Borchert-Ingersoll, Inc.
WYOMING
Billings, Mont. — Western Construction Equipment Co.
Denver, Colo. — Ray Corson Mach. Co.
Salt Lake City, Utah — Lund Mach. Co
CANADA
Halifax, N. S. — Coleman Mach. Co., Ltd.
Montreal — Watson Jack & Co., Ltd.
Regina, Saskatchewan — R. J. Fyfe, Ltd.
St. Johns, Newfoundland — Dominion Dist. Co.
Toronto — W. I. Ballentine Co.
Vancouver, B.C. — B. C Equip. Co., Ltd
Winnipeg — Mumford, Medland, Ltd.

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2086 Farmers Bank Bldg., Pittsburgh, Pa.
NEW YORK • CHICAGO • PHILADELPHIA
BIRMINGHAM • WASHINGTON
Representatives in Principal Cities


AGGREGATE BATCHING PLANTS


CLAMSHELL BUCKETS

SHEEPSFOOT TAMPING ROLLERS

CONCRETE BUCKETS

Dependable "PREformance

Dependable equipment is a means to efficient performance. This is one important "WHY" of America's magnificent production record.

Our own high standards in *every* phase of wire rope manufacture over a period of many years, has made it possible for our product to shoulder a greater share of the extra burden imposed by war. Preformed "HERCULES" (Red-Strand) Wire Rope is especially qualified for the more difficult jobs. The inherent qualities of this time-tested rope, *plus* the advantages of Preforming — make for easier, quicker and safer work . . . more production from each pound of steel . . . greater efficiency.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

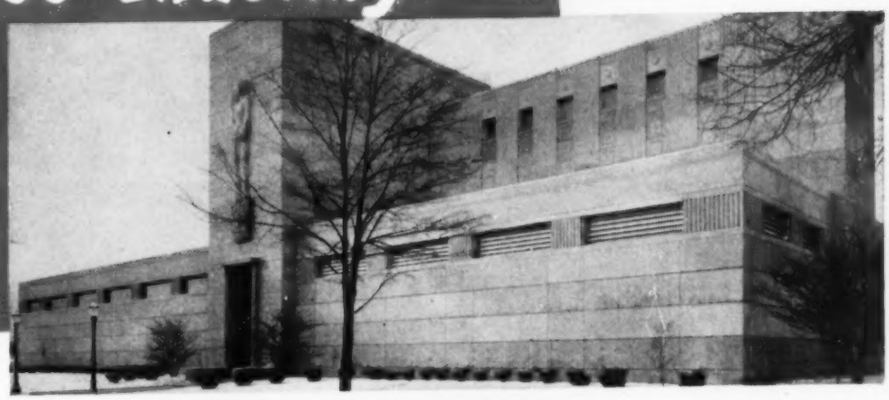
SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

No Job Too Big

Through the Economy plan, forms for placing concrete can be set-up and removed in less time, and at lower cost. Economy Forms may be shifted from one set-up to the next in large groups or panels . . . a tremendous time-saver on big jobs.

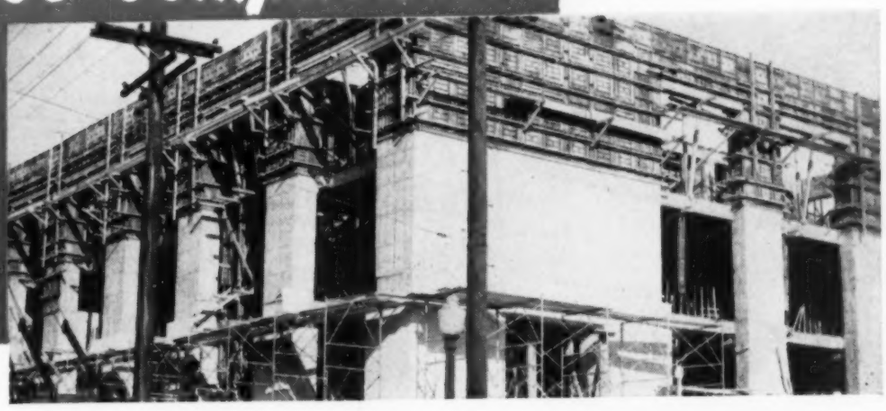
No Job Too Exacting

Buildings and Foundations . . . Tanks, round or square . . . Box Tunnels, straight or curved . . . Culverts, Bridge-piers and Abutments . . . all are easily formed with standard Economy units. You rent Economy equipment . . . only as much as you need, only as long as you need it.



No Job Too Complicated

Economy Service provides Estimates . . . Form-erection Drawings . . . Steel Forms, Spreader-ties and Accessories . . . Trained Foremen and Plate-setters for contractor to employ. Results: Faster Work, Superior Concrete, Reduced Cost, without investment in form-equipment or material.



ECONOMY STEEL FORMS

A nation-wide form-rental and engineering service that saves critical material and time in concrete construction. We welcome job inquiries by letter, wire or telephone

Des Moines, Iowa, Phone 4-3101 **ECONOMY FORMS CORP.** Fort Wayne, Ind., Harrison 2363

You

wouldn't handcuff a PITCHER!

LAY·SET *Preformed* IS FREE!

It is the preforming process that frees **LAY-SET** wire rope of self-destructive internal stresses. Being preformed, Hazard **LAY-SET** is not shackled by twisted strains. Rather, every wire and strand is free to do its full share of work from the very first hour it is put on your machine.

Hazard **LAY-SET** Preformed is a "pre-broken-in" rope; it resists kinking and snarling; it handles easier, faster, safer, and cheaper. It possesses high resistance to bending fatigue and so lasts longer—*much* longer than non-preformed wire rope. Regardless of where or how you use wire rope, whether for running or standing service, specify Hazard **LAY-SET** Preformed —the rope that gives you greater dollar value.

Ever since Pearl Harbor, and even before, Hazard **LAY-SET** Preformed has been saving time and money for the Government, the Armed Forces, and the taxpayer.

HAZARD WIRE ROPE DIVISION, Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Tacoma, San Francisco
AMERICAN CHAIN & CABLE COMPANY, INC. • BRIDGEPORT • CONNECTICUT

HAZARD LAY·SET *Preformed* WIRE ROPE

DETROIT PUBLIC LIBRARY

Cable Crossing

OUR U. S. ARMY ENGINEERS know their ropes...and for moving material over rivers and ravines it's *wire* rope.

Wire rope wherever used, in whatever type of service, needs the protection of *Texaco Crater.*

Texaco Crater penetrates to the very core, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, rust and corrosion.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

TEXACO

TEXACO CRATER

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

You can't stop PLANNING-
BUSINESS, pleasure, the desire for life itself hinges on the brightness of tomorrow's plans—even the war is being fought for the future.
Tomorrow when peace comes, all of the pent up desire to be free, to go places, to see and do things is going to burst upon the country like a flood. It is going to mean a demand for roads, airports, and railroad improvement. It is going to mean dams, bridges and buildings. It is going to require cement, aggregate, metals and machinery—and it's going to mean men and shovels, cranes, draglines and pullshovels.
Tomorrow's bidding is going to be more competitive bidding. The quality and dependability of equipment is going to play a larger part in the success of contracts than ever before. Then you'll want shovels built for the hardest job a shovel has to do—rockshovels—Northwest shovels!
Now when you are planning for the future watch Northwest performance on the high pressure wartime jobs and plan for a Northwest after the duration.
NORTHWEST ENGINEERING COMPANY
1728 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.
NORTHWEST
If it's a real Rock Shovel you won't have to worry about output in dirt

Ready Now!

NEW 1944 CATALOG and

WIRE ROPE BUYERS' GUIDE

Replaces ALL other catalogs

Changes in wire rope strengths, sizes, grades makes this new catalog a necessity to anyone specifying, using, and buying wire rope.

Information contained in the new 1944 Guide will save you delay in purchasing of wire rope, as well as help you conserve (through proper maintenance) your present wire rope.

Designed, Written for Wire Rope Users

Every wire rope user who *needs* a catalog for reference should have *this* one. It will help you on the job. This is no ordinary manufacturer's catalog. It is designed and written for the wire rope consumer.

Ask for your copy of Catalog G-15

No Charge, simply write your request on company letterhead and mail to Macwhyte Company, or any of our distributors and mill depots near you.

NO. 709

MACWHYTE COMPANY

Wire Rope Manufacturers

2941 Fourteenth Avenue, Kenosha, Wisconsin

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco

Distributors throughout the U. S. A.

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie-Rods

NEW TYPE GUIDE... Many New Features!

Inside the covers of this 160 page BUYERS' GUIDE are all the facts and figures you'd expect to find about wire rope, PLUS many that will surprise you. And it's completely indexed with visual tabs for quick reference. Here are only a few of many features:

- ★ ***All information*** **in accordance with NEW wire rope simplification plan**
- ★ ***Tabular index*** **for split-second reference**
- ★ ***Handy pocket*** **and desk size (4½ x 6½)**
- ★ ***Special binding.*** **Pages lay flat when opened**
- ★ ***Special information*** **on lubrication of wire ropes**
- ★ ***Wire rope constructions***
- ★ ***Slings***
- ★ ***How to order*** **wire rope**
- ★ ***Working loads,*** **safety factors, sheave and drum tolerances, reeling and unreeling, how to seize ropes, etc.**
- ★ ***90 pages of practical data*** **on use and care of wire rope**
- ★ ***Discount tables***
- ★ ***Glossary*** **of wire rope terms in daily use**
- ★ ***16 sections,*** **each with quick tab index**
- ★ ***Complete index*** **to each section printed on each tab index, plus a complete index in back of book, plus a special feature, "YOUR INDEX."**

When you buy wire rope be sure to specify

MACWHYTE PREformed WIRE ROPE

Just off the press...

COLORFUL 40-PAGE ENGINEERING MANUAL

Printed in 4 colors 8½" x 11"

Essential information you should have

Including Simplified AUTHORITATIVE EXPLANATION OF—

- ★ POWER FACTOR
- ★ LOAD FACTOR
- ★ MIXED LOADS
- ★ POWER CALCULATION
- ★ AND OTHER VITAL DATA

HERE ARE TYPICAL PAGES

This is by far the most comprehensive manual ever published on portable gas-electric generator plants. It includes useful technical information in language that everyone can understand. Forty pages of detailed diagrams, tables and illustrations of construction, in addition to pictures and complete specifications on 19 models of gas-electric generator plants, plus valuable information on accessories and special equipment.

If you now own or expect to own portable gas-electric generator plants, you cannot afford to be without this important 40-page Engineering Manual. Write for a copy today . . . no obligation!

Profusely illustrated, with photographs, drawings and diagrams, this new authoritative manual on gas-electric generator plants will give laymen and engineers alike a complete understanding of ways to get the utmost efficiency from generating plant equipment. Printed in four attractive colors. Size 8½ x 11 inches.

SEND FOR FREE COPY TODAY!

THE MASTER VIBRATOR CO.

DAYTON 1, OHIO

Distributors throughout the United States and Canada

PRODUCTS INCLUDE:

Portable Gas-Electric Generator Plants, Voltage Regulators and Portable Mountings • Floodlights • Concrete Vibrators (gas or electric) • Concrete Surfacing Attachments • High Speed Tools • Portable Vibratory Finishing Screeds for Concrete • Portable Concrete Floor Finishing Machine • Portable Electric or Gas Hammers and High Speed Tools.

Master Vibrator Co., 200 Davis Street, Dept. 102
Dayton 1, Ohio

Gentlemen: Please send me without obligation the new 40-page Gas-Electric Generating Plant Manual and literature on the Master products checked below:

- ☐ Concrete Vibrators (gas and electric) and attachments
- ☐ Portable Vibratory Finishing Screeds for Concrete
- ☐ Portable Concrete Floor Finishing Machine
- ☐ Portable Hammers and High Speed Tools

*Name*_____

*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

—then he said to himself

"The LIE is my political weapon"

At the start of his activity, Adolph Hitler proclaimed to the world that his weapon was the LIE

—the all-out undiluted LIE

—and now see what happens to a structure founded on bosh:

(a) the theory of the blitz *blasted*

(b) the legend of invincibility *exploded*

(c) the infallibility of his "intuitions" *fizzled*

He could have fooled a lot more people for a lot longer time, if he had only tried the trick of nursing along old truths—now turned into fallacies—but still adhered to by the unthinking majority.

For *Progress* has a way of flipping the FACTS of yesteryear into FLOPS almost overnight. The follower of an OUTDATED fact may easily find himself nursing a progress-blocking FLOP.

Here, Adolph, are samples
of yesteryear FACTS now turned FLOPS

FLOPPED FACT 1:
"You can't produce all-welded ships" . . . . . .

....Recourse to arc welding has filled the seven seas with them.

FLOPPED FACT 2:
"You can't arc weld high-temperature, high-pressure piping" . . . . . .

....The one safe way is through recourse to arc welding.

FLOPPED FACT 3:
"You can't weld cracking stills" . . . . . .

....Without recourse to arc welding—our armed forces would be without high octane gas.

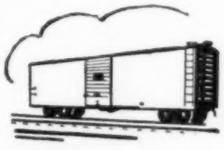
FLOPPED FACT 4:
"You can't produce army tanks with arc welding" . . . . . .

....Through recourse to arc welding—it's the only kind they're producing today.

FLOPPED FACT 5:
"You can't erect buildings by arc welding". . . . . .

....Savings in steel and money are represented in thousands of structures of every type—through recourse to arc welding.

FLOPPED FACT 6:
"Railroad cars are taboo for arc welding". . . . . .



....Watch them rolling the rails in every state—through recourse to arc welding.

THE LINCOLN ELECTRIC COMPANY • CLEVELAND 1, OHIO

America's greatest natural **recourse**

ARC WELDING

SUSPENSION CROSSING OF WATER *(Official U. S. Army Signal Corps Photo)*

GAS, OIL AND WATER SPEED THROUGH

PIPE LINES TO BATTLE LINES

DEVELOPED BY U. S. ARMY ENGINEERS

The appetite of an armored tank, a tank destroyer, or a bomber can keep a 1,000 gallon tank truck plenty busy refueling on the battle line. The further the front moves forward away from supply bases, the greater would become the number of refueling units to add to the vehicular traffic congestion.

Synthetic rubber gasketing, to join together two lengths of four-inch pipe—in training operations of engineer petroleum distribution companies. *(Official U.S. Army Signal Corps Photo)*

Long before this problem arose, the U. S. Army Corps of Engineers anticipated it. On the dunes of a desert under burning heat, high up a mountain of the Rockies in mid-winter, and over the roughest country of the Virginian Blue Ridge, Army Engineers strung portable pipe lines developed by the Corps in cooperation with private industry. Up hill, down gulleys, across water, through crotches of trees, around sharp turns, and in extreme heat and extreme cold, the lines were given terrible punishment. "Simulated combat conditions", the Engineers called these tests.

They came up with a pipe line almost as flexible in service as a tank truck. It is light and easily handled. It can stretch 20 miles a day. It can readily be moved to keep pace with swiftly shifting battle lines. Its 20 ft. lengths are easily handled and connected with leak-tight pipe couplings in a matter of minutes. The flexibility of these couplings permits laying the line over rough or smooth terrain.

Tightening Standard Gruvagrip Coupling
(Official U. S. Army Signal Corps Photo)

Due to the exacting development and testing by the Corps of Engineers, these portable pipe lines are successfully performing under fire overseas. They are responsible for faster, longer mechanized advances than up till now were possible. We salute the U. S. Army Corps of Engineers! What it has done to revolutionize the war-time transportation of liquid fuels and of water will be felt in the post-war progress of all industry.

GUSTIN-BACON MFG. CO.

GRUVAGRIP COUPLINGS

One of the Co-operating Companies

KANSAS CITY 7, MISSOURI

NEW YORK PHILADELPHIA CHICAGO TULSA HOUSTON SAN FRANCISCO

P&H

MAKES WAR ON WEAR
WITH PROPER CARE

HOW ABOUT THAT MAIN DRUM SHAFT?

Are you sure it is being lubricated correctly? And thoroughly? At the proper intervals?

If you aren't sure, the thing to do is to write today for the newest P&H Wartime Service Bulletin. It gives you a complete lubrication chart for the main drum shaft assembly . . . answers every question about kinds of lubricants and their applications. Proper lubrication is tremendously important in assuring steady wartime operation with minimum service.

P&H has already eliminated many of the usual service problems with *all-welded construction of rolled alloy steels, true rolling crawlers, hydraulic control,* and many other advanced features.

ARMY E NAVY

Another new star has been added to P&H's award for excellence in war production.

A penny postcard *now* may save you time and trouble *later*. Write for your free copy of Folder D-59 on "Main Drum Shaft Lubrication."

General Offices: 4494 West National Ave., Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

WHEN WE SAY

Portable

WE MEAN AS EASY AS THIS

There's no "inaccessible" job . . . when you have a Barco Portable Gas Hammer handy. Your Barco Portable Gas Hammer is a self-contained unit . . . low in cost . . . rugged in performance . . . portable under all conditions. With eleven special tool attachments which are available for your Barco, you can meet any job on the spot—regardless of whether it is a special one or whether it calls for regulation breaking, drilling, driving, tamping or digging. Write to Barco Manufacturing Company, Not Inc., 1812 Winnemac, Chicago 40, Illinois.

BARCO

PORTABLE GASOLINE HAMMERS

How to check your equipment performance FOR MAXIMUM TOURNAPULL OPERATING EFFICIENCY . . .

Use this Simple LeTourneau Check-List . . . It Covers Your Complete Earthmoving Cycle, Shows You How to Move Bigger Loads Faster and at Less Cost.

To help you take fullest advantage of your Tournapulls' ability to move bigger yardages fast, here is a quick, easy way to check every operating step. This simple Tournapull check-list, prepared by the LeTourneau Field Engineering Department, shows you how to keep your rigs working at top efficiency in the cut, traveling and on the fill. Use it regularly for your Tournapull check-up to eliminate waste time and speed yardage output.

Another Time-Saver— Dealer Service

If your check-up shows a need for parts or repairs, call on your LeTourneau-"Caterpillar" dealer. He's equipped to handle your service problems with a minimum of time out for repairs.

LeTourneau Co-Operator Offers More Help—Write for Copy

To keep your operators and repair crews informed on the most practical operating, service and repair methods. The LeTourneau Co-Operator is offered to you and your men FREE. 16 fact-packed pages . . . published 10 times yearly. Read regularly by over 50,000 contractors, loggers, miners and others who use and service LeTourneau equipment. Write for your copies TODAY. Address R. G. LeTourneau, Inc., Dept. CM-1, Peoria, Illinois.

LOADING . . . Check These Points

1. Are loads heaped each trip?
2. Is the load being obtained in 100 feet or less?
3. Is the load obtained in 1.0 minute or less?
4. Is traffic control keeping units coming into the pit at intervals of 1.5 to 2.0 minutes so that the pusher tractor will work efficiently — and so avoid unnecessary waiting by Tournapull units?
5. Is the pusher step-loading to reduce lost time and travel in the pit? (See job photo below left)
6. If the material is too hard to load in efficient time and distance, is Rooter being used to break it up?
7. Always establish down-hill loading. It's rarely ever impossible.

TRAVELING . . . Check These Points

1. Are roadways good enough to allow high gear travel at all times? 14 m.p.h. or over? If not . . .
2. Is the Tournapull-Scraper being used to keep haul roads in good condition? Or is a patrol available as the logical tool for this work?
3. Is each turn being made in .25 minute or less?
4. Is the operator utilizing full r.p.m. to obtain the quickest acceleration — thus increasing average speed?

SPREADING . . . Check These Points

1. Are loads being spread in the highest possible gear?
2. Is spread made in .5 minute or less?
3. Is spread being made in 65 to 100 feet (approx. 8 inches to 5 inches loose depth)?
4. Is operator getting off the fill as quickly as possible?

MECHANICAL — (Check with LeTourneau Maintenance Manuals)

1. Are all adjustments maintained?
2. Are blades installed properly to maintain sharp cutting edge?
3. Is all cable running free?
4. On hard smooth roads, are tires at maximum pressure? (See LeTourneau Tire Chart)
5. For off-the-road work, are tires at minimum pressure, in relation to the load, to obtain flotation? (See LeTourneau Tire Chart)
6. Are all mechanical moving parts greased and operating freely? (See LeTourneau Lubrication Chart)

By loading its Model C Tournapulls both ways in the borrow pit, Calumet Paving Co., Indianapolis, Ind., (above) cuts the travel time of its pusher tractor to the minimum. Notice how, as the loaded Tournapull pulls out of the pit, the pusher tractor is ready to swing around and contact the second Tournapull, already loading in the opposite direction. Smart time-saving operation!

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

LeTOURNEAU (Aust.) Pty, Ltd., Rydalmere, N.S.W., Australia

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*. TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.

*Trade Mark Reg. U. S. Pat. Off.

Maybe You Have More Tires Than You Think

Right now, on streets, highways, and construction jobs all over the country, good, sound, deep-treaded tires are failing long before their time because of mechanical and operating faults few drivers or owners even suspect.

Yet this is a needless waste of one of the nation's greatest assets. For there are proven ways of getting out of a tire every mile of service built into it—ways which if generally adopted would result in the saving of enough precious rubber to provide extra tires for everyone.

The B. F. Goodrich Company, drawing on its experience of many years in handling the complete tire maintenance problems of hundreds of truck fleets, has developed a low-cost Tire Conservation Service that cuts tire failures to a minimum.

Under this comprehensive point-by-point program, factory-trained tire men take over the complete supervision of tires. They put conservation on a scientific basis; check all factors, including mechanical defects, which cause undue tire wear; set up proper inflation schedules; and make mileage-stretching recommendations which often result in immediate cash savings.

The plan has already been amazingly successful.

Some of the country's largest fleet owners say they wouldn't be without it. Other typical comments from dozens of letters we have received are: "The B. F. Goodrich Tire Conservation Service saves far more than it costs," and "The number of failures has been reduced over 60%."

Remember this is not just another tire conservation idea, but a scientific program, based on putting tire maintenance in the hands of job-experienced tire engineers. It's another example of the leadership which makes B. F. Goodrich "First in Rubber".

Only a few trained men are available today to take over a limited number of additional fleets in certain areas. If you would like to know how this tire conservation plan can be applied to your construction equipment, write the Tire Conservation Department, The B. F. Goodrich Company, Akron, O.

NOT ON YOUR PAYROLL

but he's behind you all the time!

Cedarapids

Built by IOWA

THERE is a man with the answers in your territory. He's a real part of the Iowa organization. He's your Iowa Cedarapids Dealer.

Dealer organizations with all the necessary ramifications for service don't just happen. Your dealer today has taken seriously his job of helping to keep the construction industry equipped. He has met the need with investment in machinery, and increased facilities for better service, and he has done this in the face of daily increased difficulties in securing the proper help.

Your dealer is a solid citizen with a real interest in his community. He is behind you with trained personnel that understands your problems both from the standpoint of your needs in planning and purchasing, and for maintenance.

He is ready with the right parts and assistance to keep your machinery on the job. He is your friend with advance information on future contracts. He can help you apply for a new machine for war essential work, and, if you can't secure new equipment, he'll strain heaven and earth to keep your old equipment running. Count on your Iowa Dealer.

THE IOWA LINE
of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS — STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE PLACER MACHINES
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

IOWA MANUFACTURING CO., CEDAR RAPIDS, IOWA

The Whole World IS THEIR PROVING GROUND

IN this war, American equipment, like the American soldier, is seeing strange places and facing unusual jobs. In the humid heat of the South Pacific—in the cold and rock of the North Pacific—in the sand and heat of Africa—and in many other climates and parts of the world, Lorains are being tested as never before.

Take the case of this Lorain Crane that is salvaging a Jap destroyer. It may seem a far cry from salvaging ships in the South Pacific to erecting steel on Main Street, U. S. A., but the requirements of a good crane are the same anywhere.

Extra strength, power and speed are qualities that have always been built into Lorains. They are qualities that are being tested on a world-wide basis today and are being proved under conditions that are tougher than you'll ever face.

They are qualities to remember when cranes and shovels are available for peacetime projects.

THE THEW SHOVEL COMPANY • Lorain, Ohio

Official U. S. Navy photograph

Reg. Trade Mark

thew-Lorain CRANES

SHOVELS • DRAGLINES • MOTO-CRANES

THIS JACK GREW UP THE HARD WAY

Sixteen years of slam-banging around on industrial and construction work, in tool boxes — of lifting *over*loads, of being dropped on and being dropped! All the abuse that jacks shouldn't get, *but do*, have been given to Blackhawks. *And they took it!*

That's how Blackhawk Jacks came to be "tops." The boys who use 'em told us what *they* thought would make Blackhawk better. We listened to their suggestions—and used 'em.

There are things about building jacks that just seem to have to be learned the *hard* way. *That takes time!*

And it takes a *willingness* to listen and to learn and to *do* things better.

Blackhawk Jacks grew up the *hard* way. They're Service Proved — and Service Improved—by sixteen years of use and abuse. They can take it!

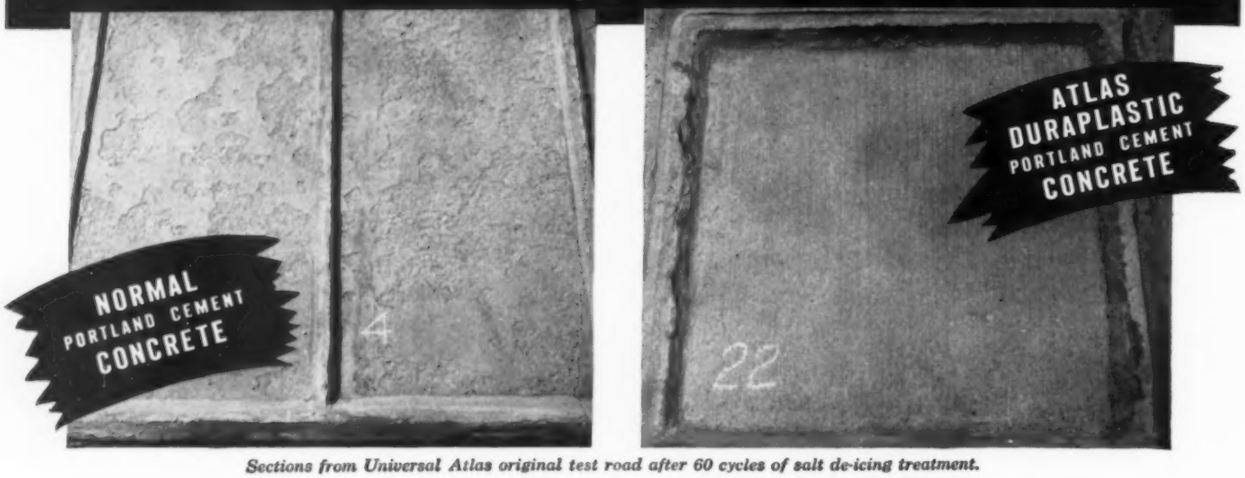
When you need a jack—buy the best —buy Blackhawk!

BLACKHAWK MFG. COMPANY
Dept. J2314, Milwaukee, Wis.

This seal is found ONLY on BLACKHAWK JACKS—your assurance of a wise and safe investment.
Capacities up to 50 tons.

BLACKHAWK

Pavement Scaling Solved



Sections from Universal Atlas original test road after 60 cycles of salt de-icing treatment.

Concrete made with Atlas DURAPLASTIC air-entraining portland cement resists freezing, thawing, and salt de-icing treatment as demonstrated by tests and proved by street and highway installations

These photographs of sections from the Universal Atlas original test road, built in 1938 at its Hudson, N. Y., plant, show the results of 60 cycles of freezing, thawing, and heavy salt de-icing applications—the equivalent of many winters of actual service. Note the condition of the standard cement section (left), while the DURAPLASTIC section (right) is 97% scale-free.

The results of this test road and this discovery by Universal Atlas have been substantiated on more than a score of street and highway installations in over a dozen states. Many of these have been through three or four winters, and all are scale-free. No oil or other protective surface treatment has been employed. In some of these areas, air-entraining portland cement is now the required standard for such street and highway work.

Atlas DURAPLASTIC is a true portland cement in which a small, precise quantity of the air-entraining material has been interground during manufacture in accordance with current Federal and ASTM specifications. In addition to all the properties which have made portland cement the favorite paving material, DURAPLASTIC has the added advantages of improved workability and greater durability.

Our Technical Service Bureau will provide detailed information on DURAPLASTIC—the cement that makes concrete scale-resistant. Write today. Ask for a copy of "Pavement Scaling Successfully Checked." Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

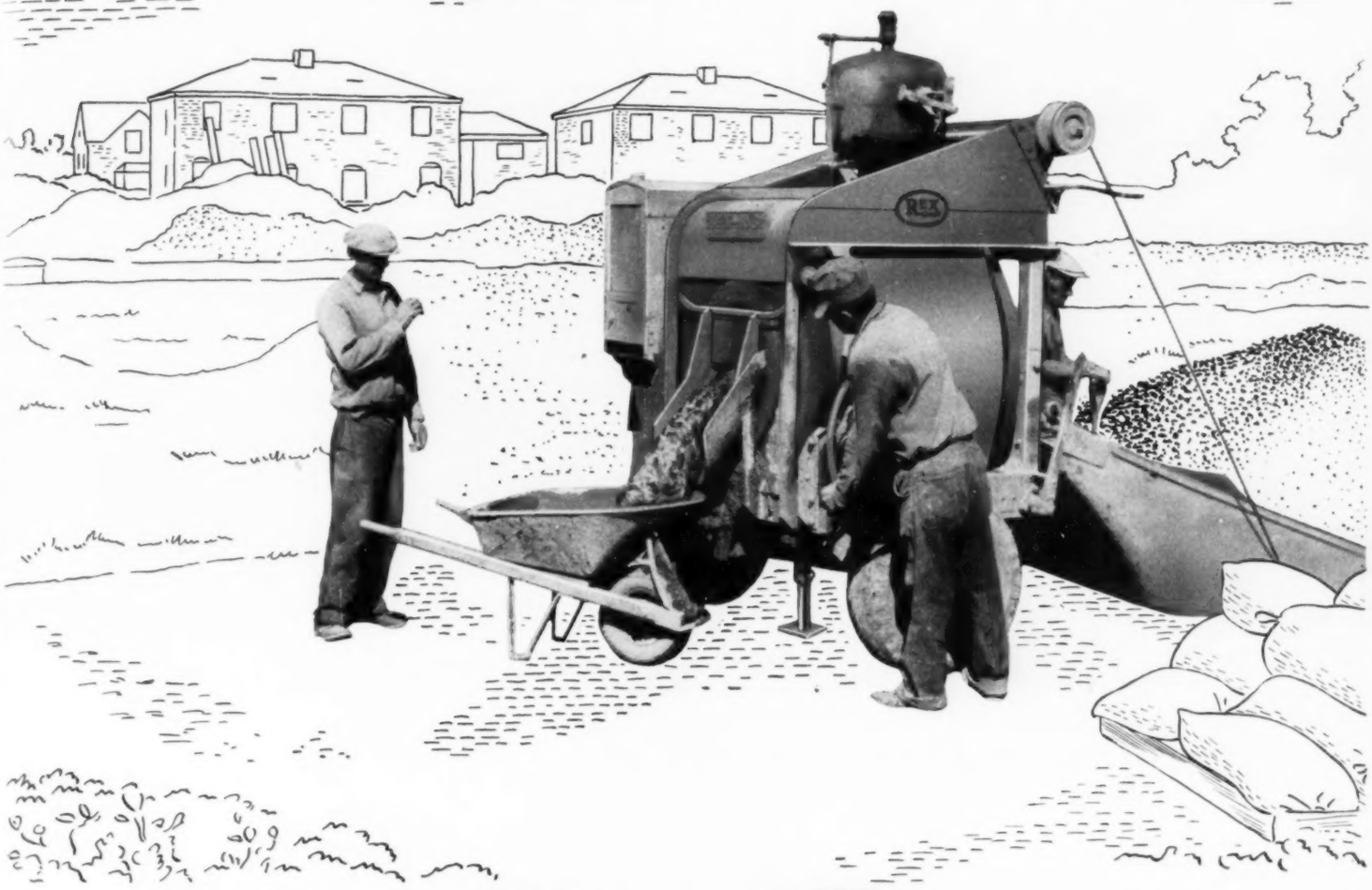
QUICK FACTS about Atlas DURAPLASTIC* cement

1. **Complies** with current Federal and ASTM specifications.
2. **Renders** concrete pavements highly resistant to scaling due to the action of salts used for ice removal.
3. **Protects** concrete against the effects of freezing and thawing weather.
4. **Minimizes** segregation and bleeding. Concrete is more uniform throughout and more durable.
5. **Permits** earlier finishing.
6. **Requires** no additional materials at the mixer.
7. **Called** ***DURAPLASTIC*** because it makes concrete more *durable* and more *plastic*.

**Trademark registered, U. A. C. Co., all rights reserved.*

CM-D-3

ATLAS DURAPLASTIC CEMENT
A Universal Atlas Product



Tomorrow Means Today...

WITH REX MIXERS

"TIME SAVERS!" That's what users call the Rex mixers. And time-savers are just exactly what these husky mixers are. With their much faster charging and their 6 to 7 second discharge, they get the jobs done faster . . . more economically. With Rex Mixers, you can change *tomorrow* into *today* on the schedule.

There are a lot of other exclusive features, too! Water control is practically 100% accurate . . . drum heads are pressed steel, die formed and welded integrally with the center sheet, eliminating pounds of excess baggage . . . the accurately formed track and rollers support the load without distortion and maintain perfect alignment through years of tough service, develop no flat spots. And the one and only chain belt drive cushions shocks—prolongs mixer life. Those aren't all! Rex mixers have other exclusive features . . . all designed to give you faster, more economical service.

Investigate Rex Mixers—See how they can help you do the job faster at lower costs. And check the other equipment in the Rex line: Moto-Mixers, to speed the mixing, hauling and placing of concrete . . . Pavers, that can give you really heavy yardage production, faster . . . Pumpcretes, that pump concrete by pipe line . . . Pumps, that move water economically and efficiently. Get the complete story. See your Rex Distributor or write Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wis.

CHAIN BELT COMPANY
of Milwaukee

REX

CONSTRUCTION MACHINERY

PUMPS | PAVERS | PUMPCRETES | MOTO-MIXERS | MIXERS

SHORTS STYMIED

Voltage surges which accompany switching and frequent starting and stopping of motors impose high dielectric stresses on the coil insulation, and can cause harmful short circuits. Yet this is an unavoidable condition of service for many motors.

The grinder shown here, for example, starts and stops every time a finished part is removed and a new part inserted. But the two Tri-Clad motors that drive it have been built to withstand safely the voltage surges ordinarily encountered in this type of service. Their ability to "stymie" shorts was proved by *the new General Electric test* described below.

External grinder, equipped with two Tri-Clad motors, installed in the milk-machinery manufacturing plant of the Rite-Way Products Company, Chicago, Ill.

New high-potential, electronic surge-tester verifies strength of TRI CLAD motor windings

This electronic test of insulation makes a "cardiogram" of every Tri-Clad motor winding, ferreting out weaknesses that might lead to shorts caused by voltage surges in service. It tests each turn, coil, and phase group of the windings for adequate insulation strength to withstand the "steep front" high-voltage surges of actual service. First developed and applied by G.E., it's one of the production tests which all Tri-Clad motors must pass as they come off our production lines. – *General Electric Company, Schenectady, N. Y.*

GENERAL ELECTRIC

Each week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.

TRI CLAD MOTORS

What's YOUR Winter Concreting Headache?

LOW 3-DAY STRENGTHS

TOO MUCH FLOOR OVERTIME

3" SLUMP—CONCRETE TOO STIFF

TOO MANY "NO CONCRETE" DAYS

NOT ENOUGH FINISHERS

LOW TEMPERATURES

TENT OVER SLAB

BEHIND SCHEDULE

CAN'T CONCRETE AFTER 1 P.M.

HEAT ANOTHER DAY—GET COKE

CAN'T STRIP YET—NEED MORE FORMS

VACUUM CONCRETE—That's the Answer!

By VACUUM-dewatering your concrete slabs 6" slump concrete is hard enough in 10 minutes to start troweling—you can concrete 3 hours longer and still cut finishing costs. Doubled early strength means most economical mix, 3-day form-removal, shortened heating period, simpler winter protection. You save time and money—all ways!

Nothing to buy—we rent you complete equipment and furnish at no extra cost supervisor who directs VACUUM-processing for you.

Use Coupon NOW ➡

VACUUM CONCRETE, Inc.
4210 Sansom St., Philadelphia 4, Pa.

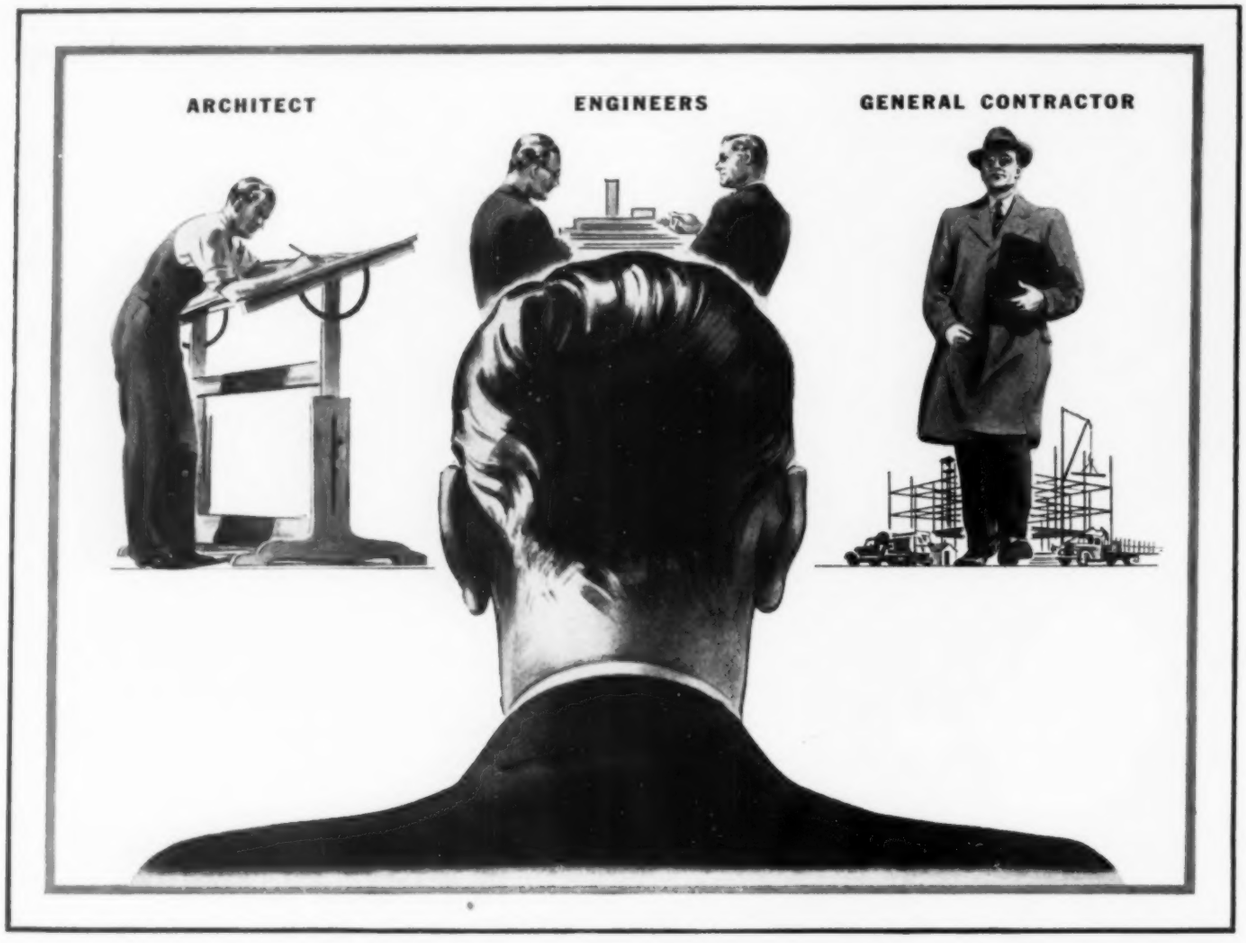
VACUUM CONCRETE, Inc.
4210 Sansom St., Philadelphia 4, Pa.

Please send me information on how VACUUM CONCRETE can help cure my Winter Concreting Headaches.

Name .....

Address .....

City ..... State .....



what can I do now
ABOUT POST WAR PLANS?

There is a tremendous amount of private and public construction that is necessary and will be needed immediately after the war is won. But if site, financing, complete plans and specifications are not ready in advance, well planned economical construction cannot start quickly; nor can the recent great progress that has been made in materials, design and construction methods be taken advantage of without advance planning.

Call in your architect, engineers and general contractor. Prepare plans now so that your needed construction project is brought to the ground breaking stage and can be built economically to serve your purpose with the maximum of efficiency. This is blueprint time!

A general contractor who is an AGC member is reliable, and competent, and can help your plan as well as construct your project efficiently and with economy.

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.

NINETY CHAPTERS AND BRANCHES THROUGHOUT THE COUNTRY
NATIONAL HEADQUARTERS—MUNSEY BLDG., WASHINGTON, D. C.

SKILL, INTEGRITY AND RESPONSIBILITY IN THE CONSTRUCTION OF BUILDINGS, HIGHWAYS, RAILROADS AND PUBLIC WORKS

. . . That *War Birds* may fly sooner

"SOMEWHERE in England"—there are lights shining through the night! There is the rumble of drum gears mixed with the clatter of concrete as it pitches from the drum buckets, a discharge bucket rolls out on the boom and another yard of concrete slithers in a ribbon across the subgrade of a new runway—

Sometimes the alert comes and the lights are doused as the Hun wings overhead.

All over the world MultiFoote Pavers are rolling out wide ribbons of concrete. The dependability of their hour after hour operation and their tremendous output is amazing, even to those who have had experience with MultiFoote pavers before.

Wartime operation has lessons that will influence peacetime profits. MultiFoote postwar owners will secure the benefits of an advance experience, smoother operation, better design and greater output — an advantage that could only come with the study of a *great number of machines on "highball" work.*

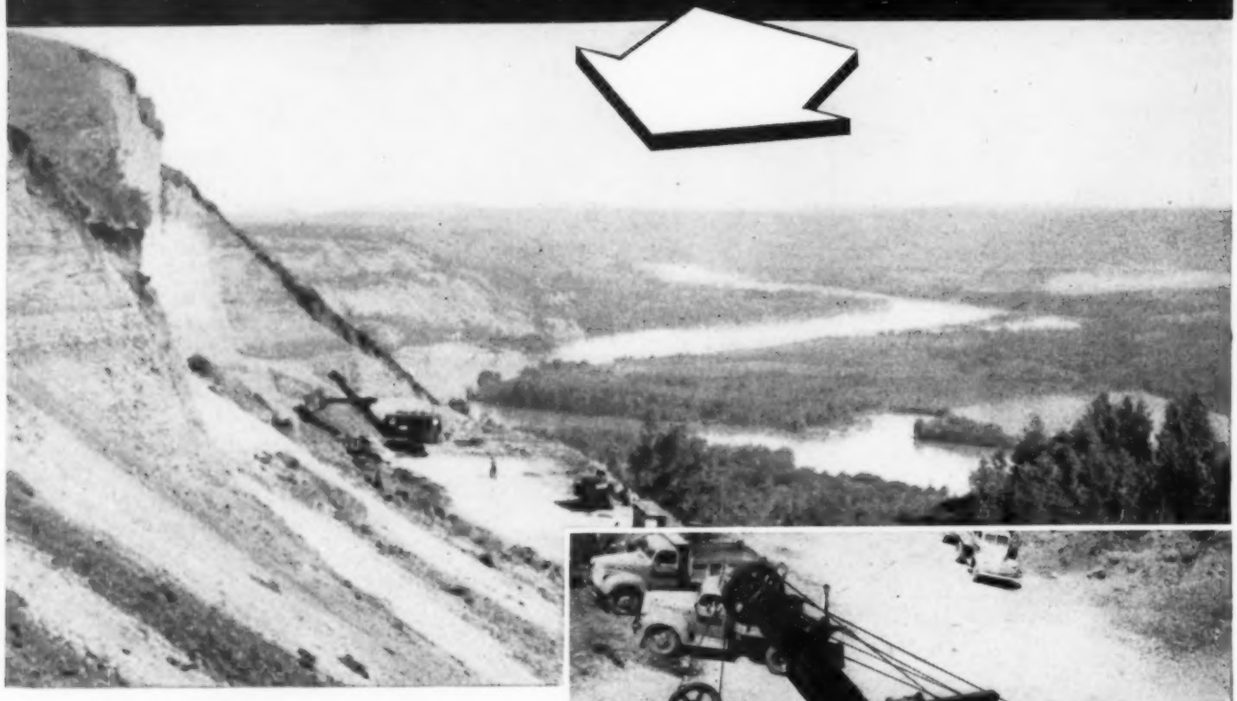
Remember there are more MultiFoote pavers in service than any other make. If we can help you in your future plans, ask for details.

THE FOOTE CO., NUNDA, NEW YORK

For black top pavement ask about the Adnun Black Top Paver. It brings you advantages that no other black top paver can offer.

MULTIFOOTE
CONCRETE PAVERS

ON THE ROAD TO VICTORY!



Osgood Shovel, #2841; Alaska Military Highway

" . . . 90,000 yards were hauled from this pit near Ft. St. John, British Columbia. With overburden depths up to 14 feet, less than 5000 yards were wasted. The greater part of this was cast by the shovel in maintaining and moving ahead on a working level . . . " W. C. Dalton, Federal Works Agency, Ft. St. John, B.C.

Wherever there are important rock, soil or sand-moving projects, you'll find OSGOOD performance "clearing the path" to speedier Victory. On the Alaska Military Highway—on all war fronts—Osgood ruggedness, power, free-action (measured air control) provide the *plus factors* so necessary for maintaining war-time job schedules.

Osgood's many duties "on the road to Victory" are providing new experience, skills and product developments for post-Victory machines. Investigate Osgood Today . . . to be ready for an earlier start Tomorrow!

Preventive maintenance keeps equipment digging in! Digging deep to buy War Bonds maintains the attack!

The **GENERAL** EXCAVATOR CO.
Sizes: 3/8 - 1/2 - 5/8 - 3/4
DIESEL - GAS - ELECTRIC
Associated with THE OSGOOD CO.

The **HERCULES** COMPANY
HERCULES *IRONEROLLERS*
6 to 12 Tons
Diesel or Gasoline
Associated with THE OSGOOD CO.

OSGOOD
Sizes:
1/2 to 2 1/2 Cu. Yd.
Diesel - Oil - Gas - Electric
SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted
THE OSGOOD COMPANY, Marion, Ohio

Best Sellers from Consolidated Steel

Pictured here are current Consolidated Steel Corporation best sellers—vital equipment produced for the armed services and essential industry in the amounts shown. (All figures estimated as of December 31, 1943.)

The diverse character of these products and the precision work involved represent scores of problems overcome, scores of new production techniques adopted. We are, naturally, proud of this array—a record in steel that has won for the men and women of Consolidated Steel every basic government industrial award.

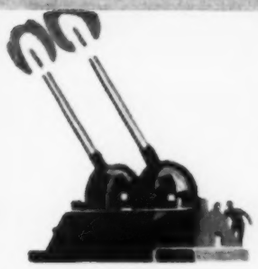
Consolidated craftsmanship, evidenced on this page, will return one day to the engineering and fabrication of *peacetime* best sellers—steelwork that will help to build and maintain America's leadership in the world of tomorrow.

Consolidated Steel

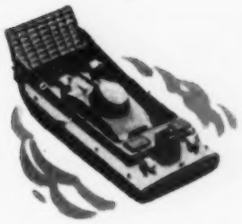
FABRICATORS
ENGINEERS
CRAFTSMEN

LARGEST INDEPENDENT IN THE WEST

CONSOLIDATED STEEL CORPORATION, LTD., LOS ANGELES, LONG BEACH, WILMINGTON, CALIFORNIA, ORANGE TEXAS



FOR THE NAVY: five-inch anti-aircraft guns. Built to tolerances of 2/10,000 in. Produced in the amount of $20,000,000.

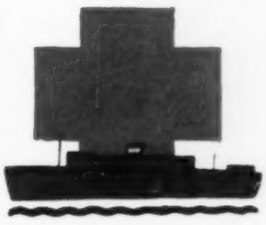


FOR THE MARINES: mechanized landing craft. Produced in the amount of $7,500,000.

FOR THE NAVY: destroyers, destroyer escorts and frigates. Produced in the amount of $295,000,000.

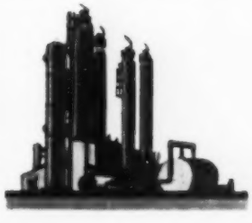
FOR THE ARMY: large infantry landing craft. Produced in the amount of $9,000,000.

FOR THE MARITIME COMMISSION: 12,900-ton high-speed Merchant Marine (C-1) cargo and passenger ships. Produced in the amount of $175,000,000.



FOR THE NAVY: hospital ships and transports. Produced in the amount of $17,000,000.

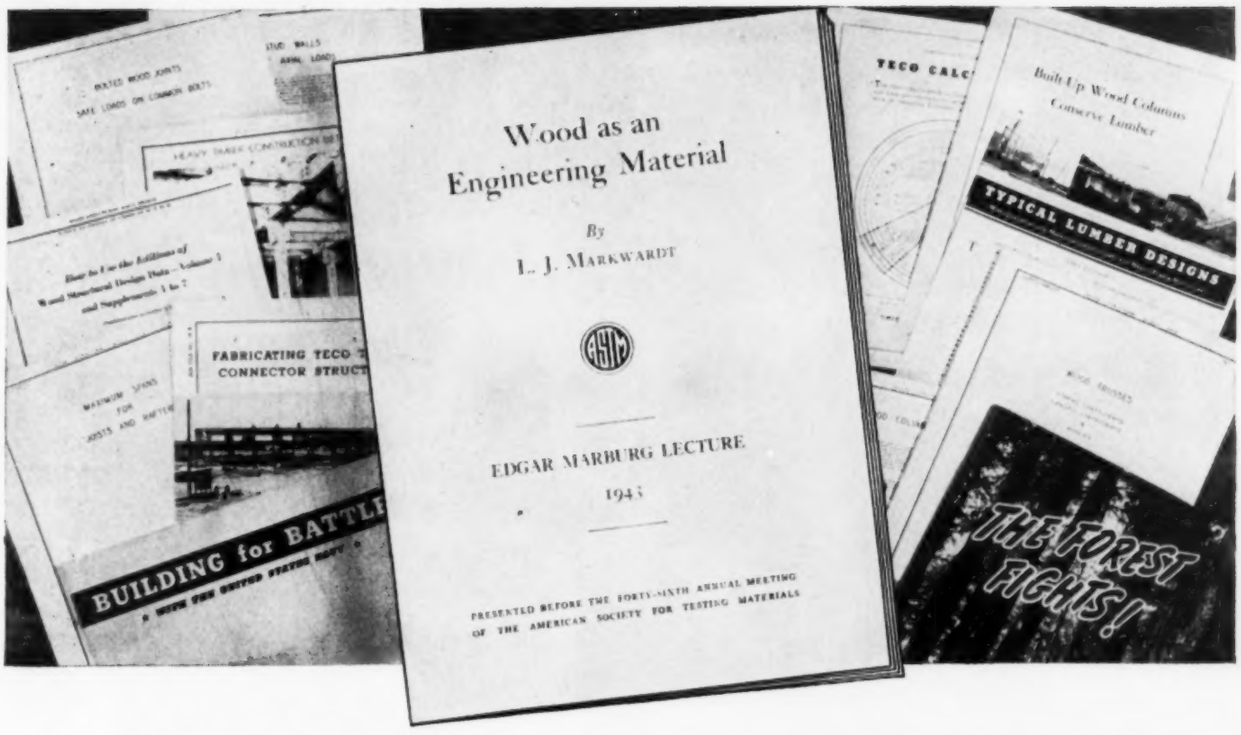
FOR AERONAUTICAL RESEARCH: wind tunnels including the world's highest speed wind tunnel as large as 16 feet throat diameter. Produced in the amount of $1,300,000.



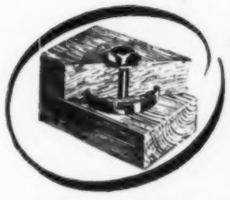
FOR WAR INDUSTRY . . . equipment for fuel, synthetic rubber and other war plants. Produced in the amount of $4,500,000.

QUALITY CONTROLLED to insure greater uniformity in the performance of clutches and brakes.

THE S. K. WELLMAN CO.
1374 East 51st St., Cleveland, Ohio
Pioneers in putting Powder Metallurgy to work for Industry . . . . . .



BASIC TIMBER ENGINEERING DATA FOR ARCHITECTS AND ENGINEERS



"WOOD as an Engineering Material," by L. J. Markwardt, distinguished research authority of the U. S. Forest Products Laboratory, was presented at the invitation of the American Society for Testing Materials as the 1943 Edgar Marburg Lecture.

The purpose of this annual lecture is to present outstanding developments in the extension of knowledge of engineering materials.

In continuation of Teco's practice of making latest information on timber available to engineers and architects, copies of this lecture have been obtained and are available on request.

Keep posted on new timber design developments. Use the *Teco* Services and *Teco* Timber Connectors and Tools.

TIMBER ENGINEERING COMPANY
Washington — Chicago — Minneapolis
Portland, Oregon.

Specify TECO
CONNECTORS AND TOOLS
ENDORSED BY LEADING LUMBER MANUFACTURERS & FABRICATORS

L

TIMBER ENGINEERING COMPANY
1319 18th St., N. W., Washington 6, D. C.

Please send me by return mail a Free copy of *"Wood As An Engineering Material"*.

Name.....

Firm Name.....

City..... State.....

Shovels Are Weapons, Too

Good Blasting Will Make 'Em Last Longer

Shovels are weapons, today. They deserve the best. An effective "preservative" is good blasting. Extra explosive for better breakage can be money well spent.

But, maybe you don't need more explosive—just a different one to get better results. Consider, for example:

ATLAS EXTRA DYNAMITES (*Ammonia Dynamites*) Medium velocity. Heaving and stressing action. A good, all-around construction and quarry explosive, particularly suited for dry work.

ATLAS EXTRA DYNAMITES (AMMONIA DYNAMITES)

GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe 1½" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 10% MORE)								
				⅞"	1"	1⅛"	1¼"	1½"	1¾"	2"	4"	5"
60%	60	12000	17000	208	160	128	105	72	54	41	11	7
50%	50	10500	13000	208	160	128	105	72	54	41	11	7
45%	45	10000	12900	208	160	128	105	72	54	41	11	7
40%	40	9300	12000	208	160	128	105	72	54	41	11	7
33%	33	8900	11500	208	160	128	105	72	54	41	11	7
30%	30	8500	11000	208	160	128	105	72	54	41	11	7
25%	25	8200	10500	208	160	128	105	72	54	41	11	7
20%	20	7800	10000	208	160	128	105	72	54	41	11	7
15%	15	7300	8500	208	160	128	105	72	54	41	11	7

***Synergism**—*The meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total of the ideas expressed—a "2 + 2 = 5" result. Synergism is a big help toward making your equipment last longer.*

As important as the type of explosive you use is the way in which you use it. If you have a blasting problem, we would like to try synergistic thinking with you.*

ATLAS EXPLOSIVES
"Everything for Blasting"

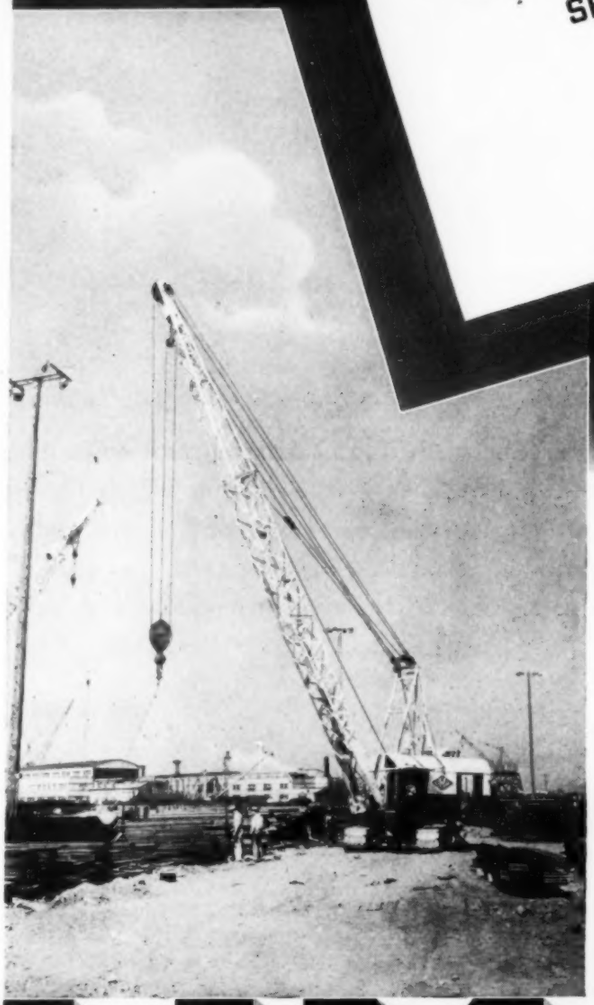
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

WE ARE NOT MAKING AS MANY CALLS AS WE DID —

LIMA

LIMA LOCOMOTIVE WORKS, INCORPORATED
SHOVEL AND CRANE DIVISION
LIMA, OHIO



but we want you to know that we are still on the job building Cranes, Shovels and Draglines without precedent, most of them earmarked for the "Armed Forces". With Uncle Sam demanding the greater part of our output and the fact that many of our sales representatives and service men have answered the call to the colors, while others are now procuring and expediting materials, we have been unable to make as many calls as we would like to on our friends and customers.

We miss those friendly contacts and opportunities to serve you. Let us hope that it will not be long before we can see you regularly and give your excavator needs our undivided attention. Your patience has been magnificent when we have had to say "no" when you needed that new LIMA so badly, but we know that you like ourselves have but one thought in mind—VICTORY and until then the armed forces must continue to have preference.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division - - - - - - LIMA, OHIO

NEW YORK, N. Y. · PHILADELPHIA, PA. · NEWARK, N. J. · MEMPHIS, TENN.
SAN FRANCISCO, CALIF. · DALLAS, TEXAS · PORTLAND, ORE. · LOS ANGELES, CALIF.
SEATTLE, WASH. · SPOKANE, WASH. · MINNEAPOLIS, MINN. · ST. LOUIS, MO.
MONTREAL, Quebec, Can. · VANCOUVER, B. C.

LIMA SHOVELS CRANES . DRAGLINES

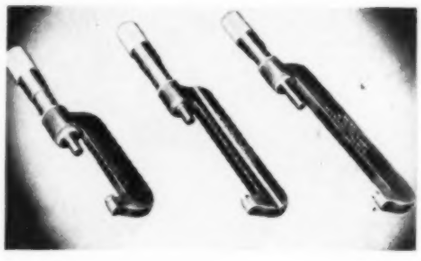
SHOVELS, ¾ YD. TO 3½ YD. CRANES, 13 TONS TO 65 TONS
DRAGLINES, VARIABLE

Top: 822-Q "Two Unit" Quarry Plant.
293-Q Quarry Plant.
Bottom: 880 Senior Dual Crusher Gravel Plant.
285-W Gravel Washing, Screening and Crushing Plant.

CRUSHED rock and gravel—in tremendous volume—is essential ammunition in the present war. Roads must be built in days instead of months, and concrete structures must literally spring from the ground. The speed with which this work is done is a typical case of American-built equipment giving important advantages over the enemy.

On every front, Universal crushing plants and rock and gravel crushers have speeded up the work. On the Alaska Highway, on South Pacific islands and elsewhere, they have established production records and functioned faithfully with minimum maintenance, so important in emergency construction. On the home front, Universal crushing equipment has done its share in the rapid building of access roads, runways and other military installations.

Universal is also producing pulverizers for fertilizer and explosives plants, and we are making a direct contribution to the war effort in the production of army ordnance equipment which we have been called upon to build. At right are gages made in our toolroom for use in producing precision parts in our shops.



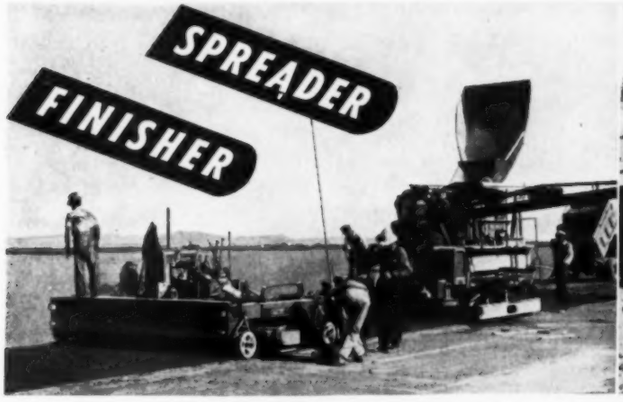
UNIVERSAL ENGINEERING CORP.

327 8th Street W. Cedar Rapids, Iowa

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

JAEGER PAVING TEAMS Have Made It Possible to Build Roads and Airports... *BETTER, FASTER, at LOWER COST*



On 10-12 Ft. Slab

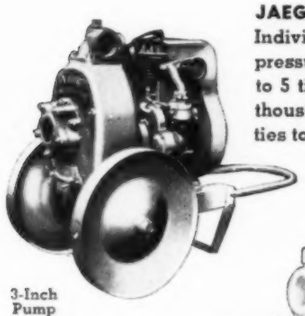
On 25 Ft. Slab

It is a recognized fact that the speed records made in paving concrete military roads and airport runways (exceeding 275 linear ft. per hour on 25 ft. width and 475 ft. per hour on 10 ft. width) have been made possible by the use of the finishing machine and the concrete spreader, both originated and developed by Jaeger-Lakewood engineers.

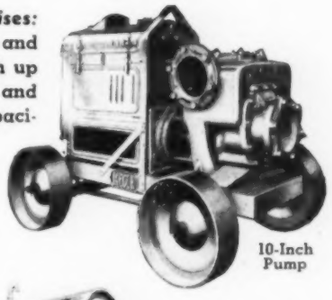
JAEGER RE-MIXING SCREW CONCRETE SPREADER, by replacing hand shovelers, makes it possible to handle and spread the stiffest concrete, as dry as ½" slump, as fast as dual drum or multiple pavers can mix and pour. Re-mixing spreader screw eliminates all segregation, densifies and improves the strength and uniformity of the slab. Single operator spreads the piles, strikes off, ready for final finishing. Also adaptable for spreading and finishing bituminous material.

JAEGER-LAKEWOOD HIGH SPEED FINISHER is the most flexible machine ever developed for finishing dry, stiff concrete at today's fast pace. Transmission in front of engine gives direct lever control of all functions—3 working speeds of 8, 12, 18 ft. per minute and 3 independent screed speeds, all gear-selected, plus unlimited speed range by engine throttle. Hydraulic screed lift, "velvet touch" screeding, 4-5 ft. telescopic width adjustment, many advanced features. Standard and vibratory models.

JAEGER "SURE-PRIME" — *the Pumps that Exceed Their Promises:* Individually factory tested and certified for vacuum, capacity and pressure, regularly exceed their guaranteed performance — with up to 5 times faster automatic priming, big air and water capacity and thousands of extra hours of service. Sizes 1½ to 10 inches — capacities to over 200,000 gallons per hour.



3-Inch Pump

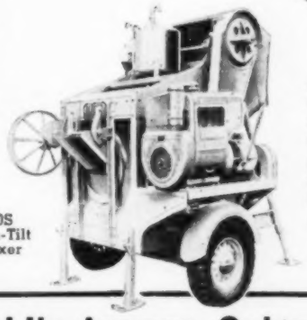


10-Inch Pump

JAEGER PUMPS have patented high-velocity "Priming Jet," high pressure shells of self-cleaning design, replaceable liners, longest-life seal, oversize construction.

JAEGER "SPEEDLINE" MIXERS in sizes up to one-half yard, have machined steel drum tracks, enclosed automotive-type transmission, run more smoothly and quietly. Fastest known loading and discharge. Perfectly balanced, easy to trail and move on Timken bearing wheels, spring shock absorbers.

3½S with Measuring Batch Hopper



10S Non-Tilt Mixer

JAEGER MIXERS are the recognized leader throughout the world—for fast production, easy handling and long life, trouble-free service.

THE JAEGER MACHINE CO.

800 Dublin Avenue, Columbus, Ohio
Service in Over 100 Principal Cities

Built Tough for Tough Going

OFF-THE-ROAD jobs call for the special Hard Rock Lug, developed by Goodyear for best performance on terrain like this.

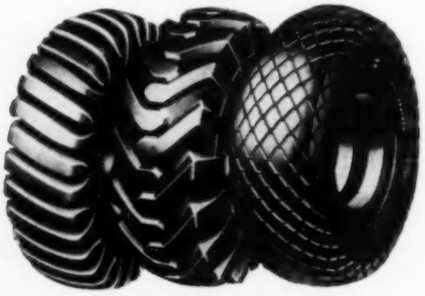
Years of accumulated "know-how" in building tires that have what it takes went into the design of this tread. It can take the jagged torture of hard rock, yet it can find sure purchase on hard and uneven surfaces.

It will pay you to tire your off-the-road equipment according to the job. If it's flotation you need for work in mud or marsh, there's the Goodyear Sure-Grip. And the Goodyear All-Weather Earth-Mover is the thing for drawn dirt movers.

The Big Three, each designed for a special use, have one thing in common — Goodyear multiple-compounded construction on a low stretch Supertwist carcass of the maximum amount of live rubber allowed by the government. All deliver more tons longer distances both before and after recapping — an important point to remember these days.

THE BIG THREE

(All with Goodyear multiple-compounded construction and low stretch Supertwist cord carcass)



GOODYEAR HARD ROCK LUG *for all rock work*

GOODYEAR SURE-GRIP GRADER *for mud and marsh*

GOODYEAR ALL-WEATHER EARTH-MOVER *for drawn dirt-movers*

Sure-Grip, All-Weather, Supertwist—T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

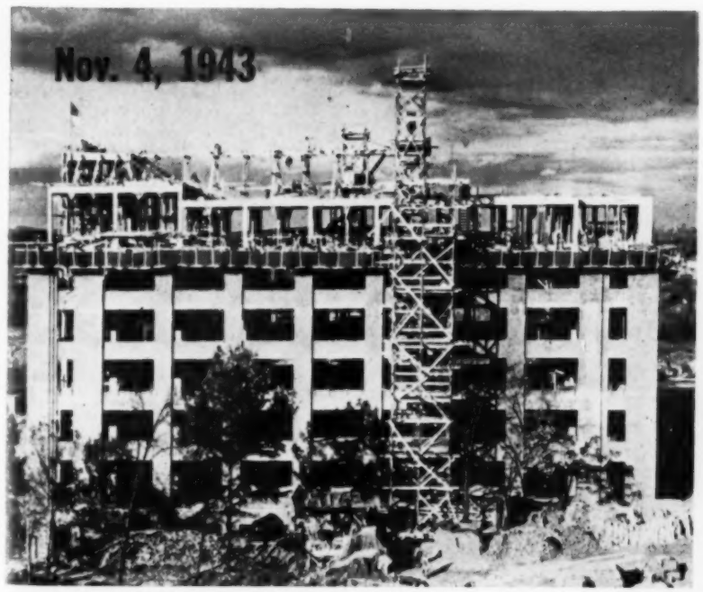
ROBERT K. TOMLIN, Editor

Volume 26 | JANUARY, 1944 | Number 1

Penicillin Plant Rushed to Completion on *88-Day Schedule*

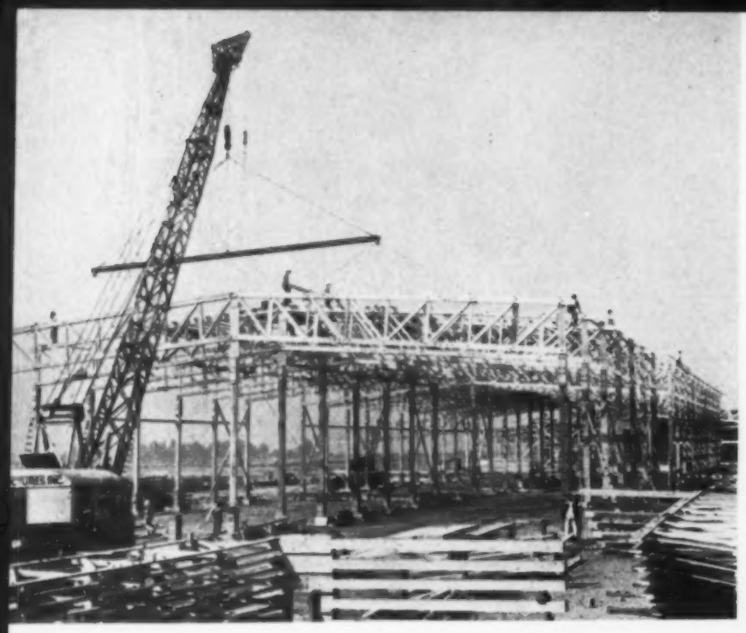
TO PRODUCE PENICILLIN, the potent germ-killing drug needed in large quantities by our armed forces, a new plant has just been completed by the Turner Construction Co. for Lederle Laboratories, Inc., a subsidiary of the American Cyanamid Co., at Pearl River, N. Y. The job was done on a schedule of 88 working days from the date work was started, fast time under present conditions. Dimensions of the five-story and basement reinforced concrete and brick factory and laboratory building are 182x82 ft.

WORK IS STARTED on first floor of penicillin plant on Sept. 9.



ROOF AND PENTHOUSES are on five-story building by Nov. 4.

FINISHING TOUCHES are put on job on Dec. 8, with schedule calling for it to be completed and ready for installation of equipment by Dec. 18.



HUGE PREFABRICATED TRUSSES are hoisted into place and bolted to concrete foundation, as one of 12 mammoth warehouses for war materiel is rushed to completion at Auburn, Wash. Completed building, which is being constructed by private contractors working with Army Engineers, will have nearly four acres of floor space.

Acme Photo

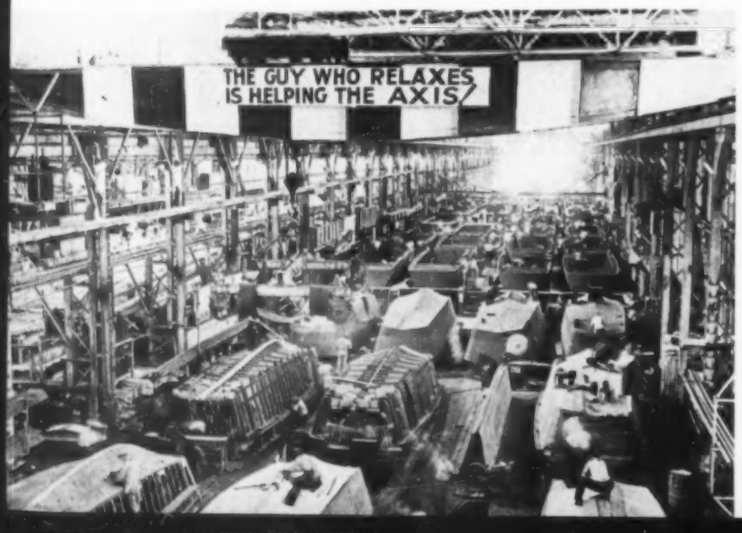
ITALIAN BRIDGE, blown up by Germans to hamper advance of Allied forces, is rebuilt by U. S. Army Engineers in 10 hr.

British Combine Photo

THIS MONTH'S NEWS REEL

WOODEN LANDING BOATS (below) for invasion troops are built on assembly line at Andrew Jackson Higgins' City Park plant in New Orleans, La. Work proceeds as each line moves slowly toward background and finished boats are hoisted to flat cars and carried from inland plant to water for launching and tests.

Wide World Photo

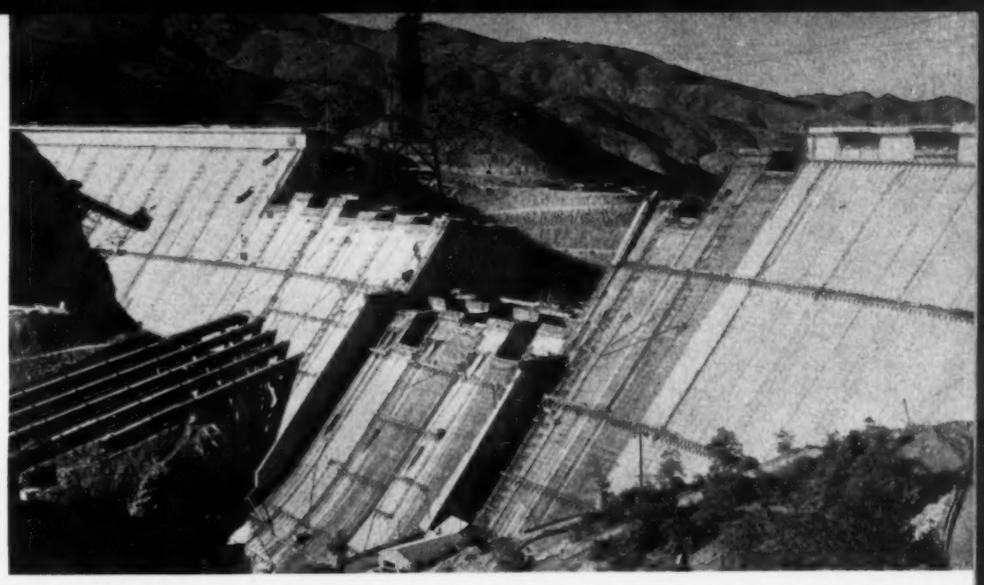


VOLTURNO RIVER PONTON FERRY (below) takes bulldozer across Italian stream as Engineer troops rush heavy equipment to build roads immediately behind first wave of infantry driving back Germans from natural barrier. Ponton bridge soon takes place of ferry to speed transfer of units across river.

Acme Photo by Bert Brandt

TWENTY-MILE CONCRETE PIPELINE is built as war public works project, under supervision of Federal Works Agency, to carry 15,000,000 gal. daily to plant of Wright Aeronautical Corp. at Cincinnati, Ohio. Water for Mill Creek Valley supply is pumped from wells at Hamilton, Ohio. Major contracts included concrete pipe manufactured by American Pipe & Construction Co. ($605,960) and by Massey Concrete Pipe Co. ($103,981) and laying of pipe by Murdock Construction Co., of Norwood, Ohio ($532,544). Alvord, Burdick & Howson, of Chicago, served as consulting engineers. Regional director for FWA is L. A. Gillett.

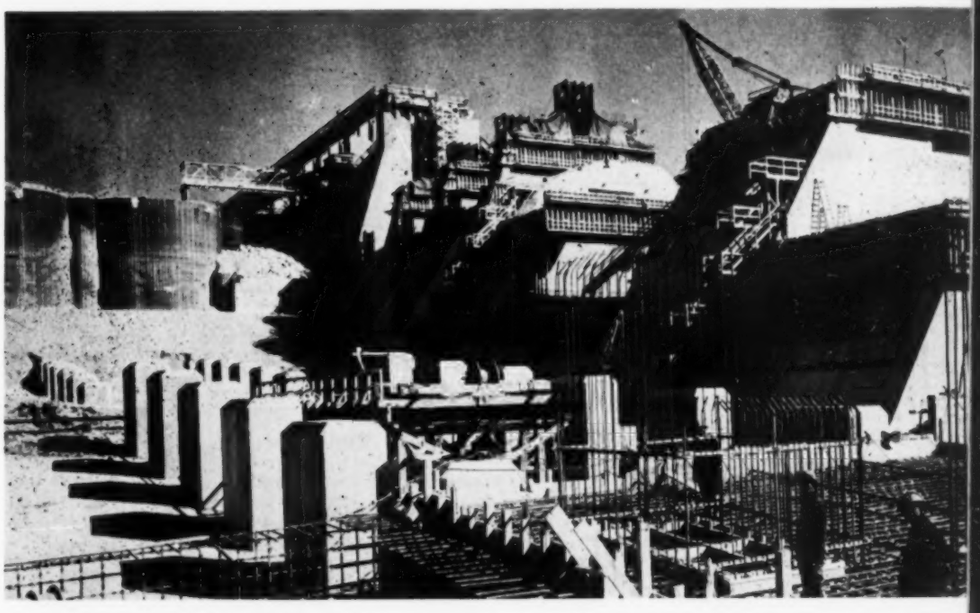
Federal Works Agency Photo



HUGE SPILLWAY nears completion on downstream face of Shasta Dam, with 94 percent of concrete already poured and last yard expected to flow this year. Waterfall three times as high as Niagara will pour over structure, which is more massive than Boulder and higher than Grand Coulee. Two Shasta generators of more than 70,000 kw. each are scheduled to go into production in March, 1944.

LEDO ROAD, new supply route to China, is being constructed by U. S. Army Engineers from Assam in Eastern India across northern Burma border. Indian women, employed by army, carry baskets filled with soil on their heads.

Wide World Photo



RISING TOWERS OF CONCRETE illustrate progress of construction in final stage cofferdam at TVA's Kentucky Dam. In background are square concrete baffle piers which will dissipate force of waters of Tennessee River flowing over huge concrete spillway when they first surge through dam next summer. Walls of dam will stand 166 ft. above bed of river and extend for more than 1½ mi. across stream.

100-OCTANE AVIATION GASOLINE will be produced this spring by $8,500,000 plant (right) built since September, 1942, by E. B. Badger & Sons Co., contractor, Boston, Mass., at Standard Oil Co. of Ohio's No. 1 refinery, Cleveland, Ohio. One day's output at this plant will be more than enough to carry 100 four-motored bombers from Britain to Berlin and back. Beyond gas absorber tower in foreground are three sets of three Houdry catalytic cracking and treating cases 33 ft. high, each case containing 15 mi. of vertical tubing nested within 12-ft. dia. Note concrete bents to support portion of plant's pipe bands; oil lines required for plant are equivalent to 37 mi. of 4-in. pipe. During construction, erectors use 55 tons of welding electrode to weld field connections in pipelines and process facilities.

BUILT-UP PLATE GIRDERS AND COLUMNS with webs of plywood and flanges of laminated lumber furnish structural framing for 7½-acre warehouse addition at Army Service Forces Depot. Resembling steel plate girders in appearance, laminated timber beams come to job completely shop-fabricated and painted, ready for erection by mobile crane. I-section and continuous plywood web of laminated beam generally effect reduction in quantity of lumber and in depth of structural member as compared with timber truss.

Photo by U. S. Army Signal Corps

Army Warehouse

Framed With Laminated I-Section Timber Members

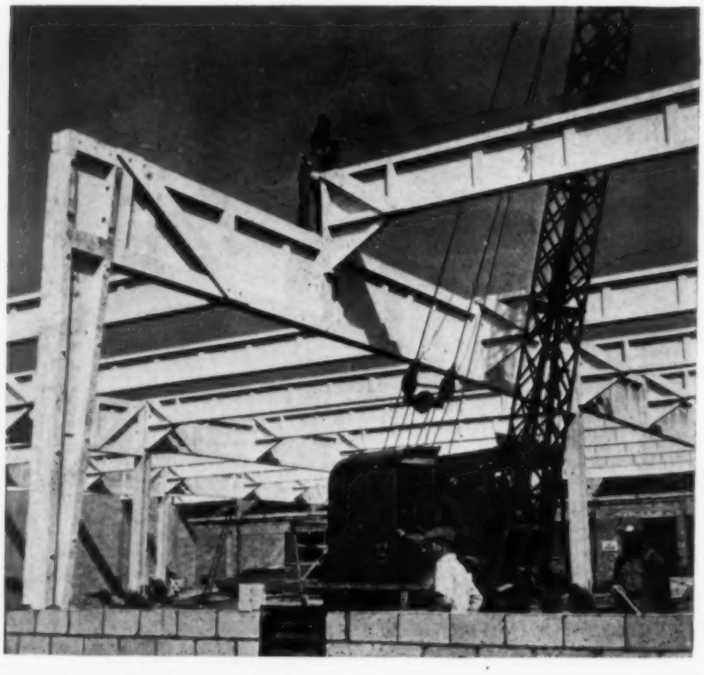
LAMINATED WOOD CONSTRUCTION in the form of built-up plate girders and columns has appeared during the last two years in more than 150 structures, of which a new warehouse addition erected for the U. S. Engineers by Robert H. Evans & Co., contractor, Columbus, Ohio, at an Ohio Army Service Forces Depot, is a representative example. In this structure, 156x2, 162 ft. in plan, bays

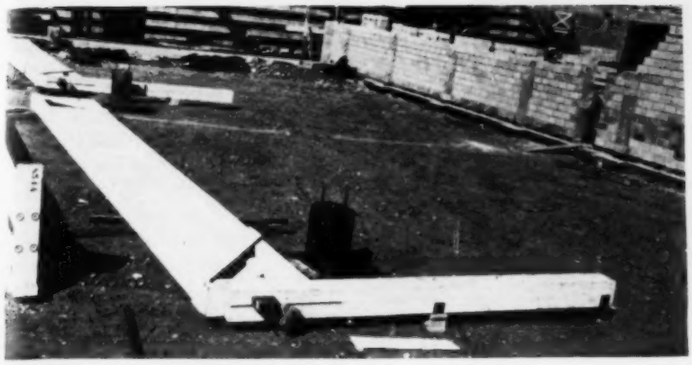
EXTERIOR COLUMNS (below) adjacent to concrete block wall have triangular shape, flaring toward top, for greater stiffness in supporting outside canopy to be hung from these columns. Crane is raising longitudinal beam about 40 ft. long which will be framed between two transverse main girders.

Photo by U. S. Army Signal Corps

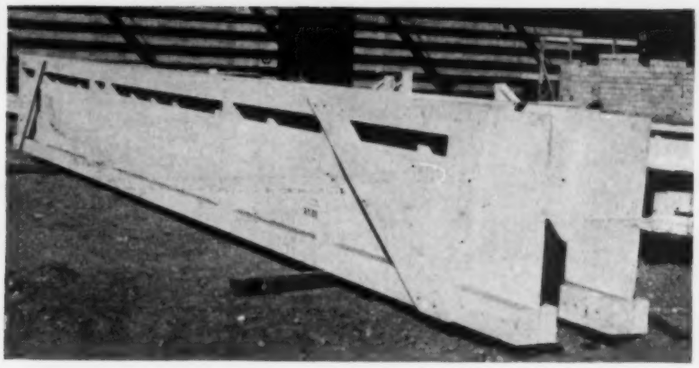
LONGITUDINAL BEAM (below) about 40 ft. long is set in position between two main transverse girders. Ends of longitudinal beam are knee-braced with additional triangular panels and diagonals below bottom chord. Upper chord of beam rests at both ends on top of transverse girders.

Photo by U. S. Army Signal Corps





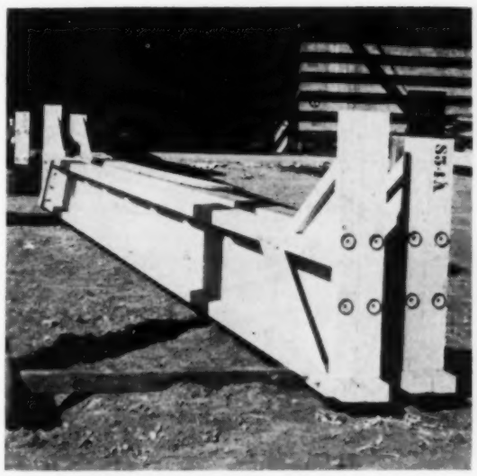
PREPARATORY TO ERECTION, assemblies of main girders and columns are made up on ground. In foreground, note temporary wooden washers taking up extra lengths of bolts connecting end posts of girder to timber column.



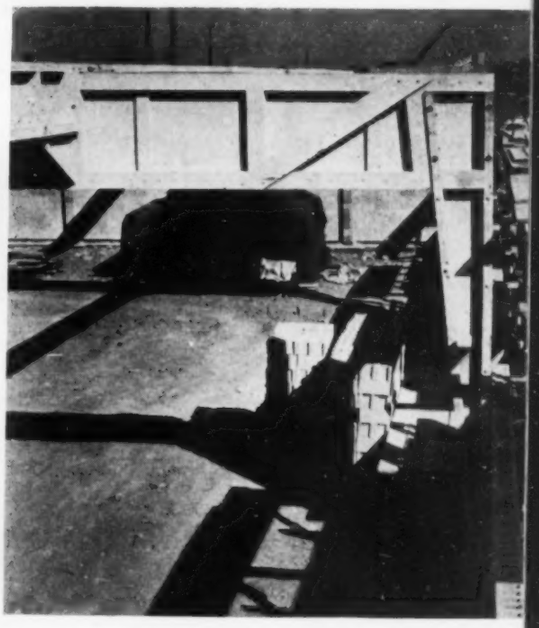
MAIN GIRDERS which frame into exterior columns are designed with extended upper chords (turned down) and plywood webs to fit between column flanges when girders are erected in final position.

45 ft. wide and 40 ft. long are framed with shop-fabricated timber members designed and supplied by Timbeam, Inc. Each member consists of a solid plywood web with laminated dimensioned lumber, glued and doweled as necessary, for flanges and stiffeners. Beams built up in accordance with this design bear a strong resemblance to steel plate girders. All field connections are bolted, with timber connectors being used in some of the joints, and the timber members are erected on a tonnage price basis, comparable to the price for erecting bolted steel.

By comparison with timber trusses, laminated timber beams are lighter in weight and shallower in depth, providing greater clearance within a fixed overall height. Because of its I-shape, the built-up laminated timber beam generally employs about half the amount of lumber required in a timber of rectangular or square shape to do the same job. As a



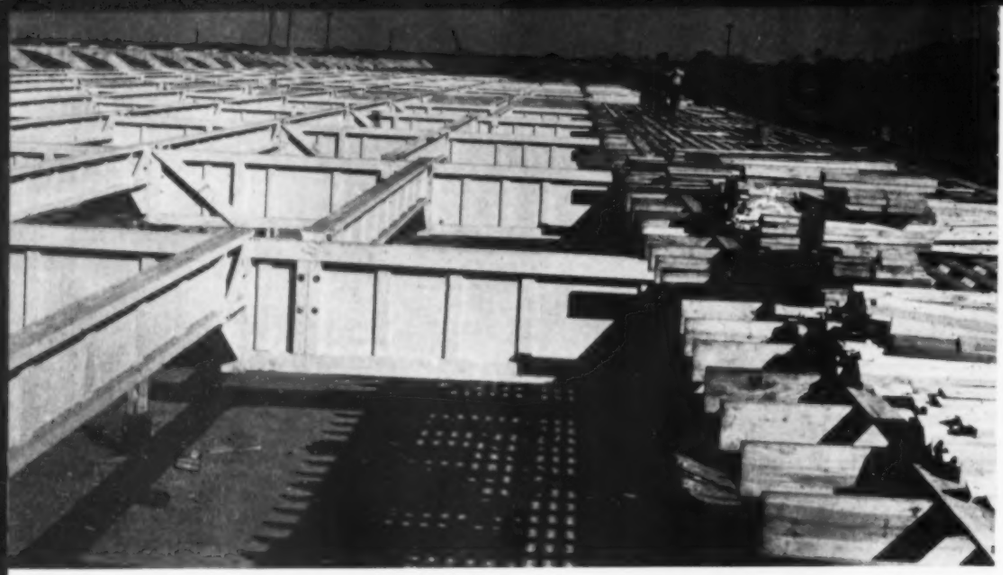
SPLIT-RING CONNECTORS are used in end posts of longitudinal girders for connection to built-up web sections on main girders. Upper chords of beams, here turned down, extend beyond end posts to rest on top of girders.



IN ERECTED POSITION, outer end of main girder has upper chord resting on top of column and plywood web fitting between column flanges.

MAIN ROOF FRAME (below) has longitudinal beams of 40-ft. span on 15-ft. centers framed into transverse girders spanning about 45 ft. between supporting columns.

TO PROVIDE SUPPORT (below) for exterior canopy on other side of concrete block wall, intermediate triangular-shaped columns are erected at 20-ft. spacing, midway between main structural columns, and are anchored at top by diagonals from adjacent girders of timber frame.



SECONDARY ROOF FRAMING of 2x10-in. joists on 30-in. centers is laid transversely on longitudinal beams, which are offset slightly in places to provide openings for roof monitors. In background, note sheathing of 1x6-in. boards on 12-in. centers to save lumber. These sheathing strips are covered with insulation board and built-up composition roofing.

comparison, it might be said that the laminated plate girder is to solid lumber what rolled steel I- and H-sections are to solid steel slabs.

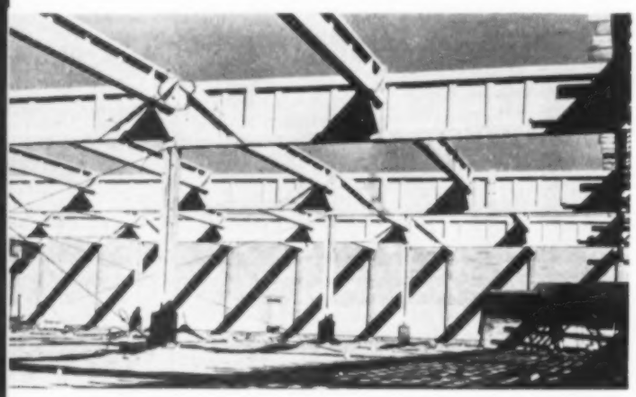
Structural framing of the warehouse addition is indicated by the accompanying photographs. The addition has a width of three 45-ft. bays (plus a span of more than 21 ft. over a former freight platform to connect with the existing warehouse) and a length of 54 bays 40 ft. long arranged in typical six-bay units 240 ft. long between firewalls. Minimum clearance inside the building under the laminated plate girders and beams is 14 ft., and the maximum headroom is 15 ft. 4 in.

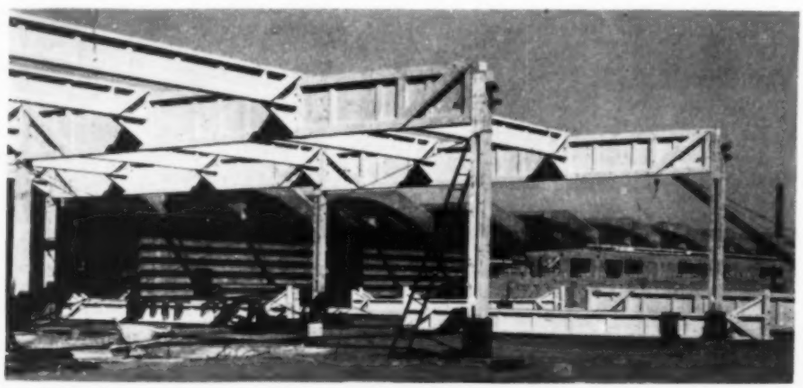
Main girders, running transversely across the building, have a horizontal bottom flange and a sloped top flange pitched 8 in. per 45-ft. span to provide roof drainage. All members have webs of ¾-in. plywood and flanges built up of laminated 2x8's, 2x6's, or 2x4's. The main girders, of 45-ft. span, are 54 in. deep at the upper end and 46 in. deep at the lower end, and the flanges of these girders are made up of three glued and doweled laminations of 2x8-in. lumber on each side of the web at the upper chord and the lower chord. Stiffeners are 2x6-in. pieces. Longitudinal beams of approximate 40-ft. span have uniform depths of 32 in. or 28 in. and laminated (glued, nailed, and doweled) flanges made up of three layers of 2x4-in. lumber.

Interior columns are designed to an H-section, with overall outside dimensions of 12x12 in. A ¾-in. plywood web 12 in. deep has flanges of 4x6-in. lumber glued and doweled to the web up to the point where the plywood is omitted to provide a slot for the webs of girders supported on the column. Wood filler pieces are used between the flanges in this upper portion of the column. Girder-to-column connections are shown by accompanying photographs.

Longitudinal beams frame into the transverse girders on about 15-ft. centers. Beams, 32 in. or 28 in. deep, have

(Continued on page 141)



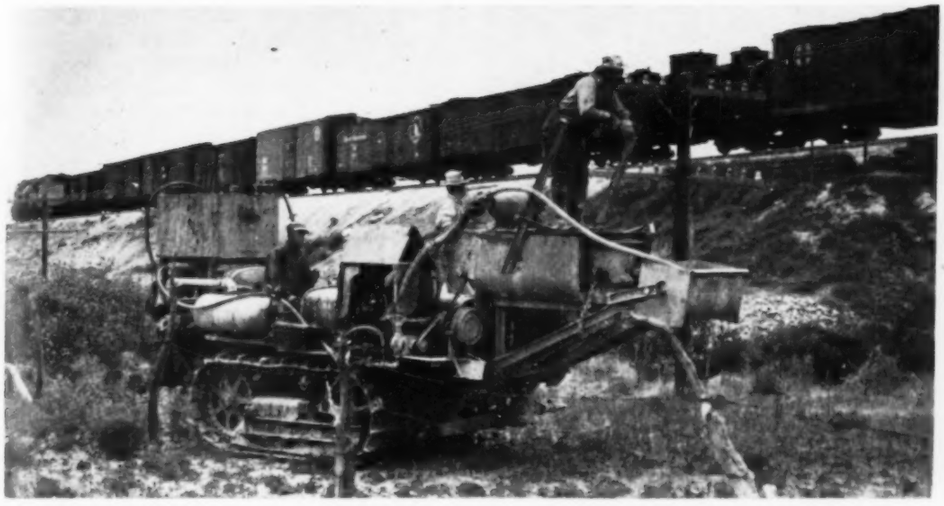


WAREHOUSE FRAMING of built-up laminated timber girders, beams and columns, seen from below, reveals use of H-section columns and I-section girders and beams.

SHOP-FABRICATED TIMBER COLUMN (below) for warehouse structural frame is handled by crane.

ON TOP OF INSULATION BOARD (below) tacked to sheathing strips, workmen apply first layer of three-ply composition roofing.

Pressure Grouting Stabilizes Weak Railway Roadbed



SELF-CONTAINED GROUT PLANT moves under its own power to new position along railroad tracks.

INJECTING CEMENT GROUT in water pockets under railroad track is an effective method for stabilizing weak roadbed. Experiments by four railroads in 1941 and 1942, according to a recent report by Frank W. Capp, of the Portland Cement Association, indicate that grouting is followed by immediate improvement in track riding qualities and reduction in track maintenance requirements. Grout injection can be made without interfering with track movements by ordinary maintenance labor, using noncritical materials and equipment improvised from parts usually found in local shops.

One railway is successfully using hydraulic, rather than pneumatic, methods to apply grout. A complete grouting plant, including compressor, mixer and grout pump, is mounted on a tractor for easy movement by running along the track or in the field along the right-of-way. For crossing bridges, planks are laid to protect the bridge ties. The air compressor is the standard tie-tamping unit on a tractor furnished the section gangs. At the rear is a water tank and on the front are cantilever brackets which support an air-driven motor that drives the mixer and the single-cylinder grout pump. The mixer has twin compartments with horizontal shafts fitted with mixing blades. Mixing is done in one compartment while the other is discharging into the pump pressure chamber.

The grout pump is mounted vertically and consists of a single piston 5⅞ in. in dia. having a 17-in. stroke, which runs at a speed of 8 to 10 strokes per min. and delivers 2.4 cu. ft. of grout per min. or 5.4 cu. yd. per hr. The continuous supply of grout furnished is thought to be a real advantage. Pressure is applied in a series of pulses ranging from zero to the maximum required to cause grout to flow.

Grouting Operations

Work is expedited by driving a bullet-nose solid bar of special drill rod steel, 1 7/16 in. in dia. by 5 ft. 7 in. long, to a depth up to 5 ft. with a jackhammer and immediately pulling it by means of a claw bar and a pinch plate. After removing the solid bar, grout points made of stainless steel tubing with hardened steel insert tips and steel driving heads are inserted. These pipes, which have an outside diameter of 1¼ in. and bore of 13/16 in., are driven with air-operated spike-driving hammers.

The grout plant is positioned near the track for serving 100 ft. each way. Two solid points are driven and immediately withdrawn by the claw bar. Into the holes six to eight grout points are driven in succession and as soon as grouting is completed at one point it is pulled and advanced to a new position. The rate of progress has ranged from a minimum of 40 to a maximum of 600 track ft. per 10-hr. day, with an over-all average of 300 ft. Grouting costs vary due to track condition, traffic volume, equipment used, technique employed and availability of materials and labor. Costs reported for the hydraulic method range between 40 and 80c. per track ft., with an overall average of less than 60c.

AS GROUT IS INJECTED, cracks form in blanket covering coarse ballast.

RAILROAD GANG drives solid steel bar to depth up to 5 ft. It will be removed with claw bar and pinch plate to make room for grout points. Some grout points are already in position.

Nine Conveyor Belts HAUL CLAY FOR ANDERSON RANCH DAM

HIGHEST EARTHEN DAM in the world, requiring 12,000,000 cu. yd. of clay and other types of soil will be the Anderson Ranch Dam in the south fork of the Boise River, 70 mi. from Boise, Idaho. It is being constructed by the Morrison-Shea-Twaits-Winston Co., contractors, for the U. S. Bureau of Reclamation. Supplementing another flood control and irrigation dam farther down the river, the new dam will be 444 ft. high above its foundation and 350 ft. above the streambed. Until the dam is completed, which is expected to require several years, the river's flow will be diverted through a specially constructed 1,600-ft. tunnel, 20 ft. in diameter, through a hillside.

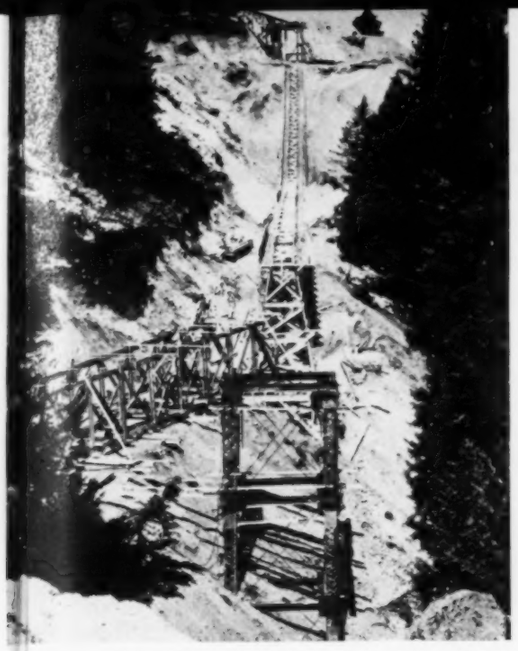
Conveyor Haulage System

For the first time in construction of an earthen barrier, conveyor belts form the main haulage system, with nearly 30,000 ft. of belt supplied by the Goodyear Tire & Rubber Co. Nine flights of belts in 36-in. widths carry impervious clay for the core of the dam from a borrow pit 1½ mi. away. Several 60-in. belts help provide the pervious materials for the exteriors of the dam from another borrow pit. Some of the electricity needed for the dam's construction is generated by

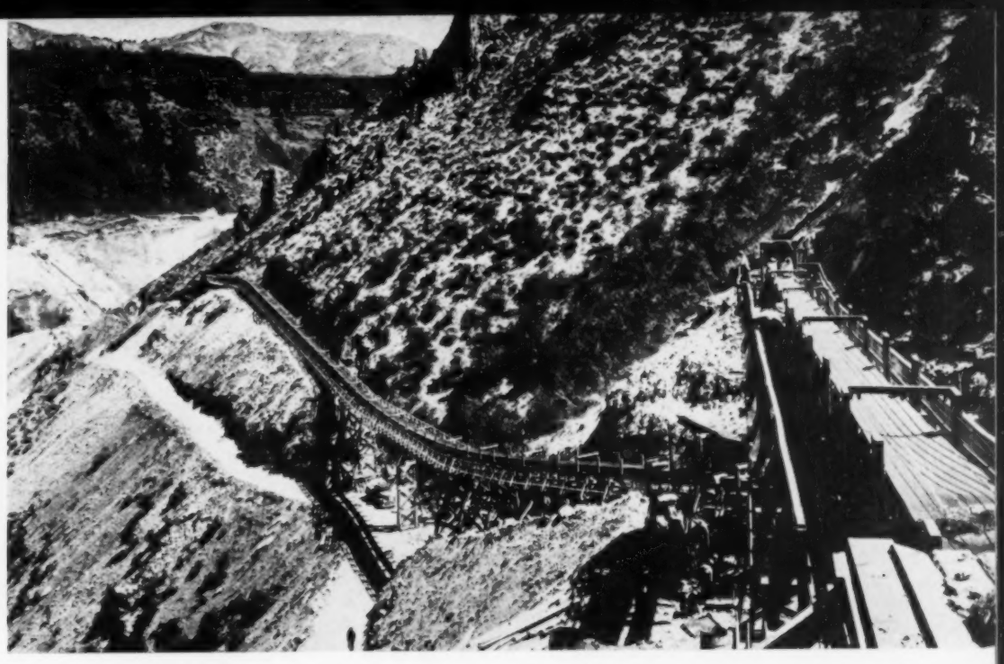
DOWN PRECIPITOUS WALLS of Boise River canyon comes belt bringing clay to damsite. Walls rise at 45-deg. angle to height of 800 ft. and then vertically as rim-rock for additional 150 ft. Mounted on track at point 100 ft. from tail, ninth belt can spread clay in circle where needed or in piles for trucks.

CLAY FOR ANDERSON RANCH DAM (below) starts 1½-mi. trip from borrow pit on first of nine conveyor belts. From borrow pit it is carried on 36-in. belt to surge pile atop wooden tunnel.

CONVEYOR BELTS LEAD (below) from borrow pit to site of world's highest earthen dam. Almost 6,000,000 cu. yd. of clay will be taken from pit for dam core.



NINE FLIGHTS OF BELTS drop clay about 1,193 ft. in journey from pit to bottom of dam's core, approximately 100 ft. below normal river level to afford bedrock base for dam.



LAP OF BELT SYSTEM crosses gully to transfer clay to next flight. Belts also generate part of electricity for dam's construction.

the belts and the generators also act as brakes to prevent too rapid speeds.

On both sides of the damsite, the walls of the Boise River canyon rise at a 45-deg. angle to a height of about 800 ft. and thence vertically as rim-rock for an additional 150 ft. On each side of the canyon is a rolling surfaced plateau, one of which stretches away to the Sawtooth mountain range and contains the pit of clay 1½ mi. downstream. To transfer 5,900,000 cu. yd. of this clay to the damsite means a drop via conveyor belts of approximately 1,193 ft. to the bottom of the dam's core, which is about 100 ft. below the normal river level to afford a bedrock base for the dam. After the clay pit is completely excavated, it is estimated that there will be a depression nearly 150 ft. deep.

The clay is carried on a 42-in. belt at the pit to a surge pile atop the wooden tunnel that houses the start of the conveyor belt system to the damsite. Vibrators on the surge pile keep constant supplies of the clay dropping to the tunnelled belt to start the clay's journey across arroyos and down canyon walls. The first belt from the surge pile, 1,663 ft. long, drops the clay 91 ft. down an 18-deg. angle, while the second belt travels farther downhill at a 15-deg. angle until it crosses an arroyo. The second flight has a net drop of 81 ft. over a distance of 1,527 ft.

Scales Record Tons per Hour

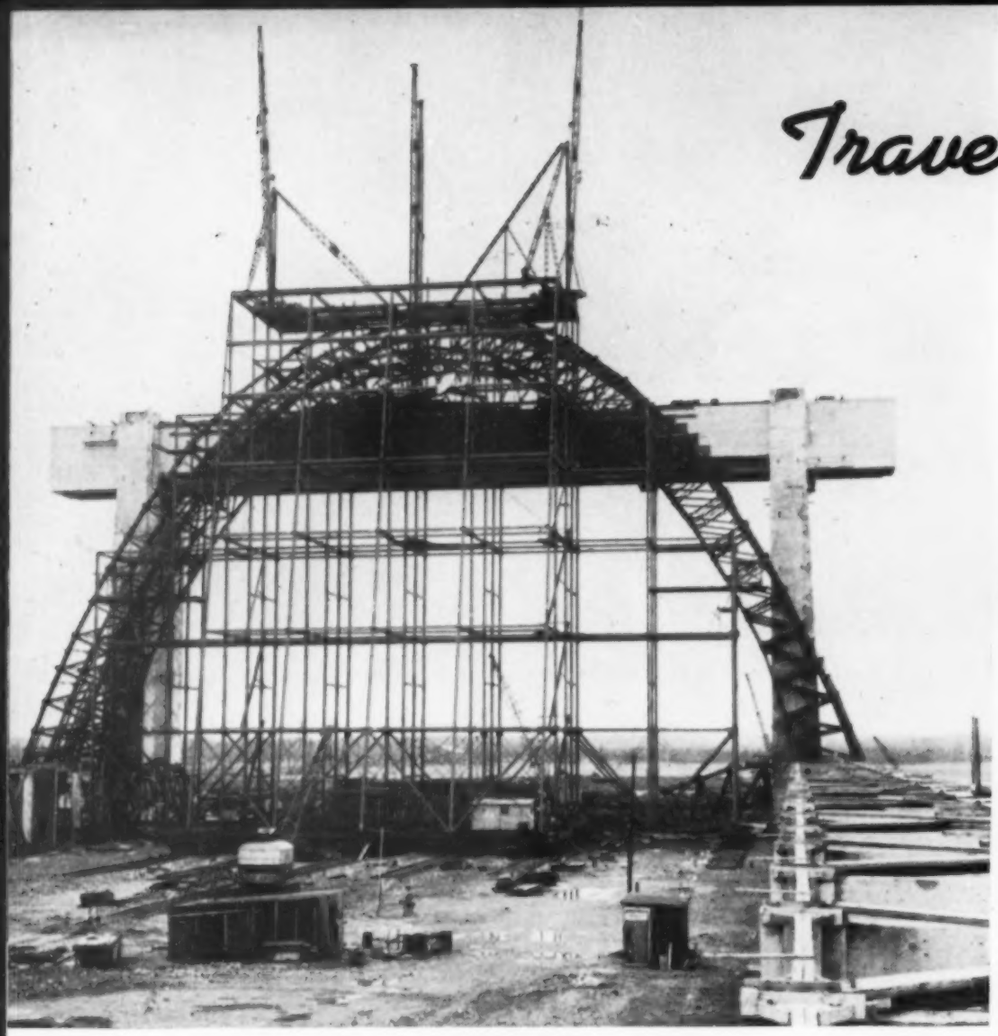
Belt No. 3, 1,338 ft. long, traverses another tunnel and transfers the material to the fourth flight, which is 758 ft. long with a 69-ft. drop. To weigh the tons per hour passing over the conveyor system, scales are mounted on the fifth belt, which is 891 ft. long with a drop of 135 ft. Flight No. 6 travels 491 ft. with a drop of 32 ft. while Belt No. 7 originates beneath another surge pile and is housed at its beginning in a wooden tunnel. The

(Continued on page 130)

WORK CONTINUES on Anderson Ranch Dam, which is expected to require several years to build. It will be 444 ft. high above its foundation and 350 ft. above streambed.

CONTRACTORS' BASE OF OPERATIONS (below) is downstream from Anderson Ranch Dam, 70 mi. from Boise, Idaho, in south fork of Boise River.

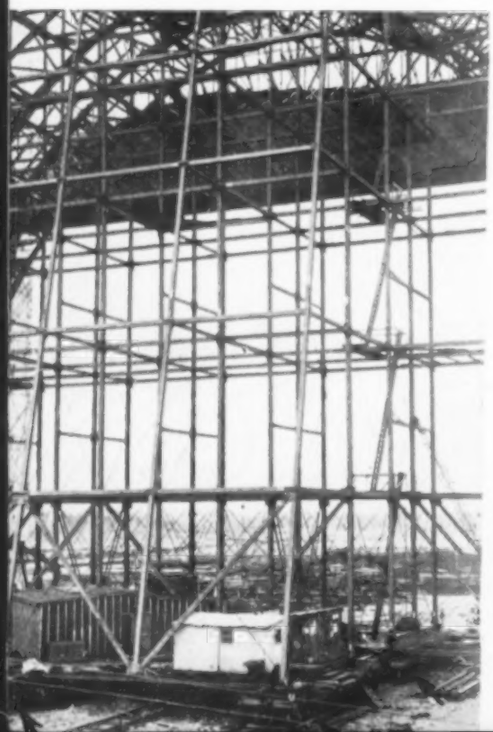
Traveling Scaffolds



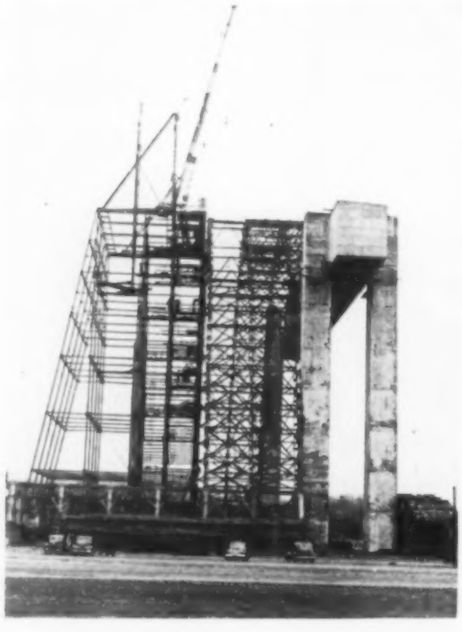
TRAVELING STEEL SCAFFOLD carrying two stiff-leg derricks erects timber arch trusses of 237-ft. span and 157-ft. vertical clearance for blimp hangar. Guy derrick at top of steel frame is used for erecting and dismantling traveler.

HANGAR CONSTRUCTION moves rapidly under direction of LOVELL H. SMITH (left), general superintendent for Sawyer Construction Co. and V. Barletta Co., prime contractors, and HORACE (Harry) STETLER, general erection superintendent for Harris Structural Steel Co., erection subcontractor.

RAILROAD FLAT CARS (below) on seven lines of track (indicated by arrows) support steel frame of erection traveler. Hoists to operate two stiff-leg derricks are mounted on bottom tier of steel frame.



EACH TIMBER ARCH TRUSS (below) is supported by steel-frame traveler until arch has been closed and cross-braces have been placed between it and previously completed arch.

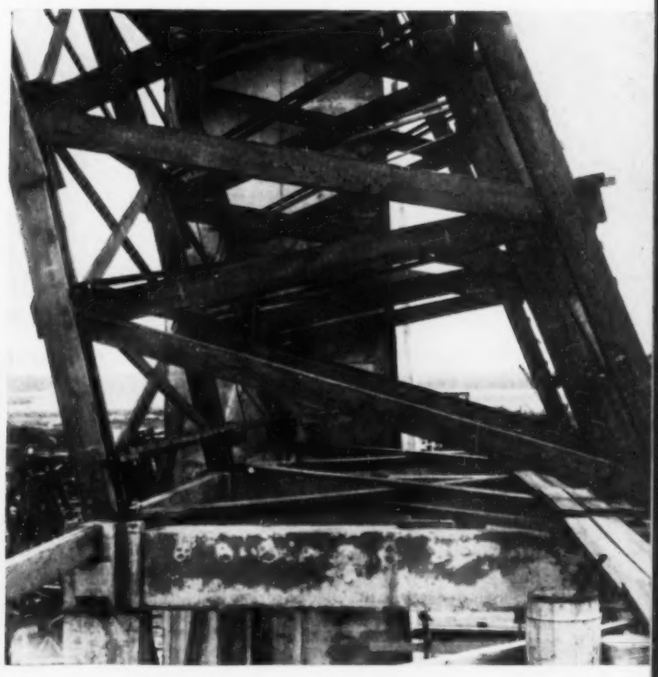


AT TWO NAVAL AIR STATIONS for lighter-than-air coastal patrol blimps, contractors have used large traveling scaffolds equipped with stiff-leg derricks to erect timber arch hangars with a clear span of 237 ft. and a clear height of 157 ft. from the floor to the lower chords of arch trusses at the crown. Each hangar includes a total of 51 arch trusses on 20-ft. centers to cover a length of 1,000 ft. The timber trusses rest on reinforced-concrete bents 24 ft. high. Depth of the trusses is 19 ft. at the base and 13.6 ft. at the crown. Door structures at the two ends of each hangar increase the overall length to 1,058 ft.

For erection of a timber hangar at the South Weymouth, Mass., Naval Air Station, a traveling steel jumbo previously used in a steel truss hangar was adapted to the new job by the Harris Structural Steel Co., New York, erection subcontractor for the Sawyer Construction Co. and V. Barletta Co., Boston, joint holders of a general contract. To erect a similar hangar on the Texas Gulf Coast, where hurricane winds must be taken into account, a substantial timber-frame traveling jumbo was assembled at the Hitchcock Naval Air Station by three joint contractors, Norgaard & Shaw, Vilbig Bros., Inc., and Nathan Wohlfeld, all of Dallas, Tex. At both locations, the travelers were mount-

ERECT HUGE TIMBER BLIMP HANGARS . . . Part I

RIGID-FRAME CONCRETE BENTS 24 ft. high support timber arch trusses on 20-ft. centers for hangar 1,000 ft. long.



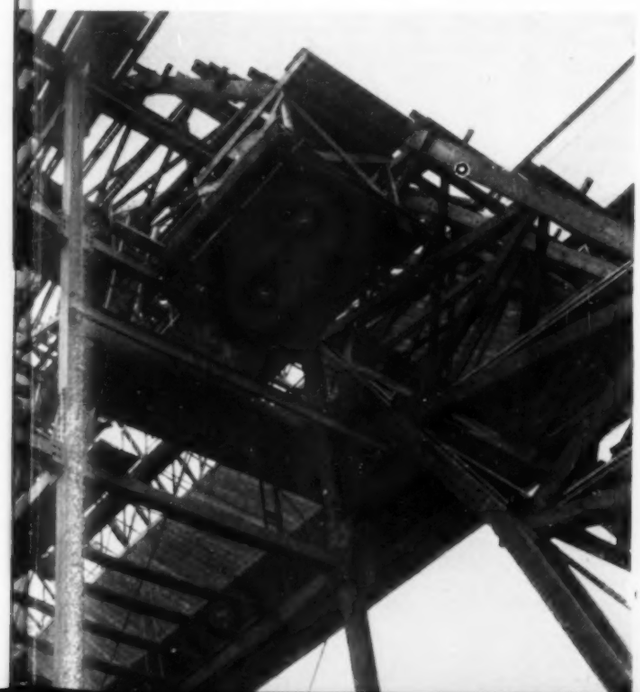
HAUNCH SECTION of arch truss is fastened down by anchor bolts to concrete bent.

ed on railroad cars or car trucks to move on parallel lines of track; the mobile scaffolds were designed to support stiff-leg derricks which erected the timber arch trusses in sections.

Part I—Steel Jumbo

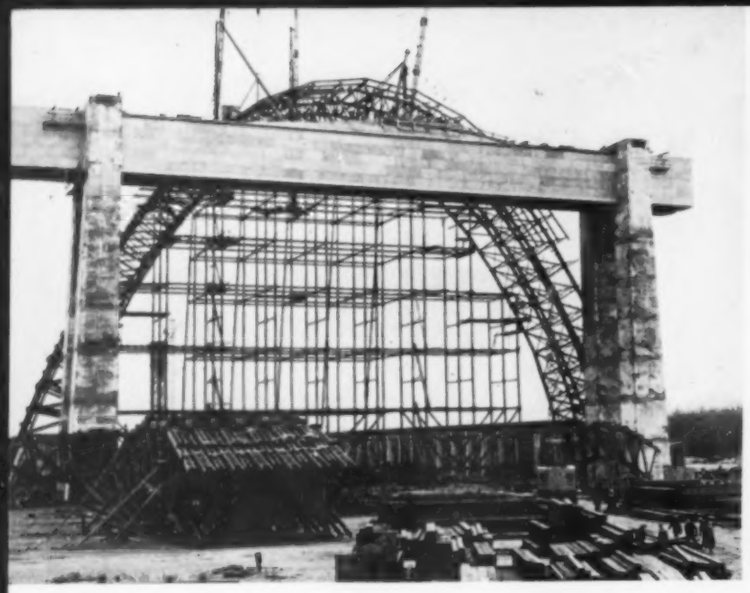
As used in the first place to erect a steel hangar at South Weymouth, the Harris jumbo, 200 ft. wide, 86 ft. long and 175 ft. high, consisted of about 500 tons of steel H-section columns and struts arranged in 25-ft.-square panels cross-braced with steel rods. At the forward corners on top of the steel frame were two 25-ton-capacity stiff-leg derricks, one having a 90-ft. boom with 10-ft. jib, and the other a 100-ft. boom with a 10-ft. jib. Because conditions prohibited moving the jumbo intact on railroad tracks to its new location, the unit was dismantled and reassembled. Dismantling was accomplished by a guy derrick which had remained in position at top center of the frame after erecting the scaffold and the stiff-leg derricks.

Only minor modifications were necessary in adapting the steel traveler for erection of the timber arch trusses, which have a shorter span and rise than the steel trusses of the first hangar. Above the first tier of framing, assembled on rail-



ADJACENT TO SPLICE POINTS (left) between sections of timber arch truss, steel-frame traveler provides supports equipped with jacks and shims to adjust arch for closure.

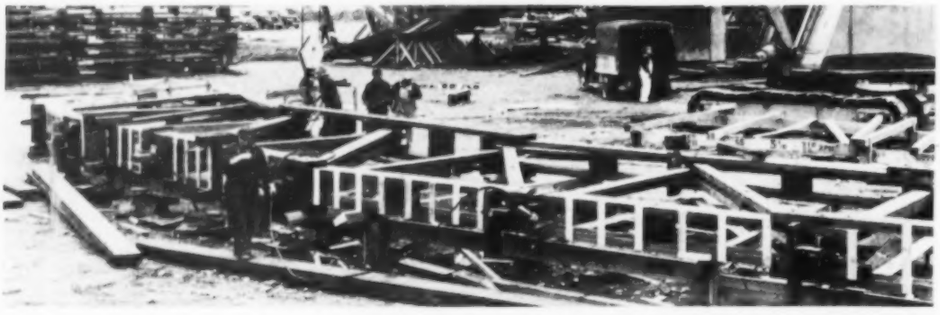
ROOF PURLINS (right), struts and cross-braces are installed between newly erected arch and previously completed hangar framing before scaffold supports are released to let traveler move ahead.



TIMBER BOX GIRDER spanning 220 ft. between concrete door-pocket towers is erected with aid of steel-frame bay temporarily attached to traveler. Temporary bay has been dismantled, and girder is being covered with asbestos-cement siding. In foreground is treated Douglas fir timber stacked in orderly piles for use in assembling arch trusses.

CONTRACTORS' ENGINEER (above) for Sawyer-Barletta organization on hangar job is CARL OLSON.

NUMBERED PILES supply pre-shaped pieces of treated timber for fabrication on layout frames into arch trusses.



ON LAYOUT FRAMES marked for position of timber members, sections of arch trusses are assembled and bolted together, with Teco split-ring connectors in all joints. Note wooden rungs nailed to upper chords of truss to provide ladder for workmen. Splice connections between truss sections, made on traveler scaffold, employ shear plate connectors to simplify splicing operation.

ASSEMBLED TRUSS SECTION is lifted off layout frame by crawler crane to be stored in vertical position on special railway trucks for later delivery to traveler erection derricks.

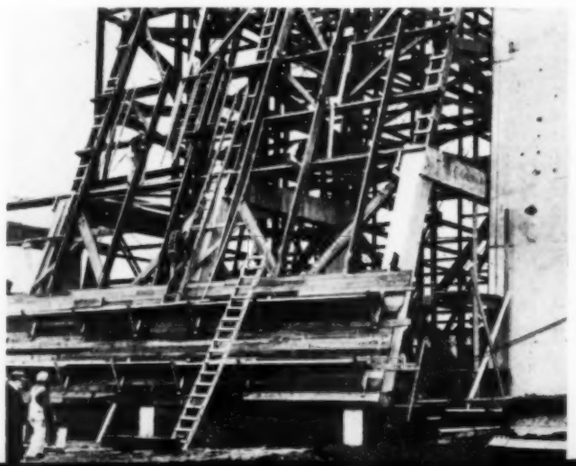
road cars by crawler crane, the guy derricks re-erected the remainder of the jumbo, jumping progressively upward on the frame itself, as in conventional building procedure, and set the stiff-leg derricks in their former positions. The jumbo provided three points of support for each half arch, adjacent to splice connections between sections. At each support, shims and a screw jack were available to adjust the arch for closure.

Each half-arch, consisting of 18 panels, was erected in three sections, spliced at panel points 6, 10 and 18, the last being the closure splice at the crown. Timber members for the arch trusses came to the job precut to precise length, bored and routed for timber connectors, treated for fire resistance and marked for position in the structure. Cross-section dimensions of the timbers ranged from 6x14 and 4x14 in. at the base of the arch to 3x12 and 3x14 in. at the crown. Carpenters assembled the truss sections on layout frames marked to correspond with the timbers. All connections were bolted together with Teco timber connectors between the members to develop shear strength. Split-rings were employed in assemblies fabri-

(Continued on page 136)

ROOF SHEATHING (below), starting at concrete bents, is applied horizontally on rafters supported by purlins.

GUYED IN VERTICAL POSITION (below) on special railway trucks, truss sections are ready to be rolled ahead for pick-up by erection derricks.



JOB oddities

JAPANESE ENGINEERING INSTRUMENTS captured on Attu are examined at office of Seattle Engineer District. They include theodolite, steel tape, beam compasses, steel straight-edge, brass protractors, and steel water gage.

U. S. Navy Photos

HOT OR COLD, it's all the same to Navy's Seabees, here shown, at right, on survey work in South Pacific and, at left, running level at advanced naval base in Aleutian Islands.

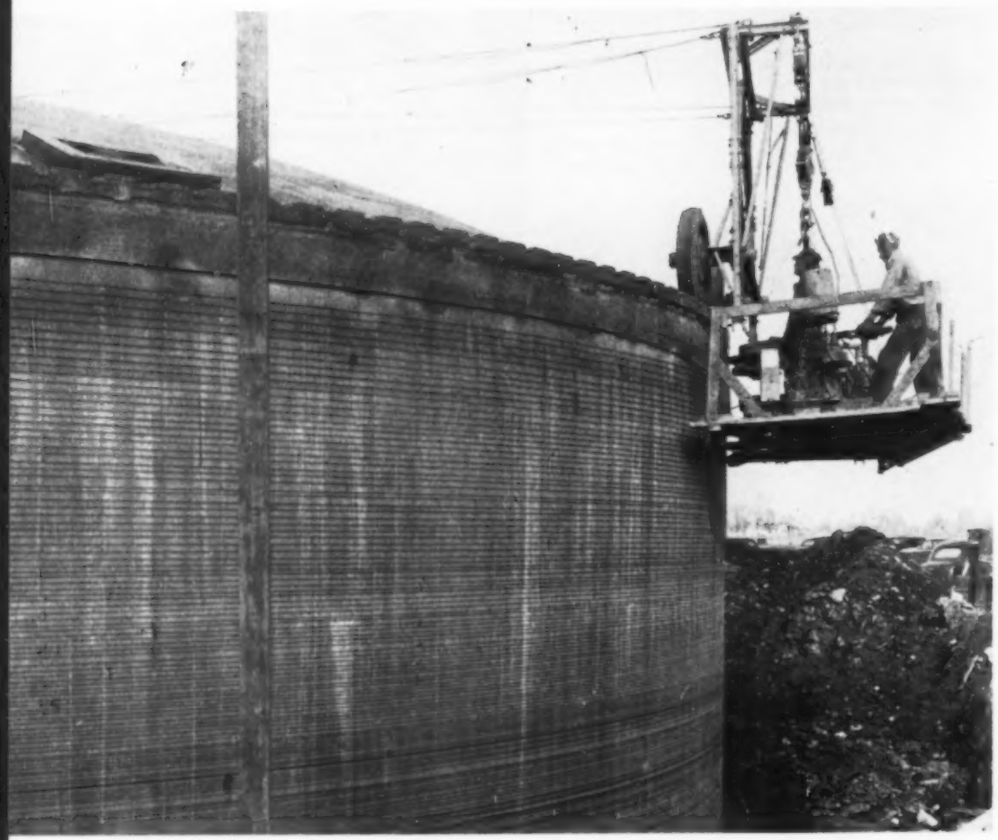
PIERCING GROUND FOG AND SMOKE (left), at Standard Oil Co. of Ohio's No. 1 refinery, Cleveland, new flare stack for 100-octane aviation gasoline plant built by E. B. Badger & Sons Co., contractor, Boston, Mass., carries 24-in. gas pipe 220 ft. above ground, where excess gases will burn in flame 50 ft. high when plant's gas holders reach capacity this spring.

TO CARRY OIL DRUMS (right), needed in construction of Inter-American Highway at San Isidro, Costa Rica, pack mules are equipped with this special saddle cushioned by matted grass blanket.

Merry-Go-Round Machine

Applies High Tensile Steel Wire to

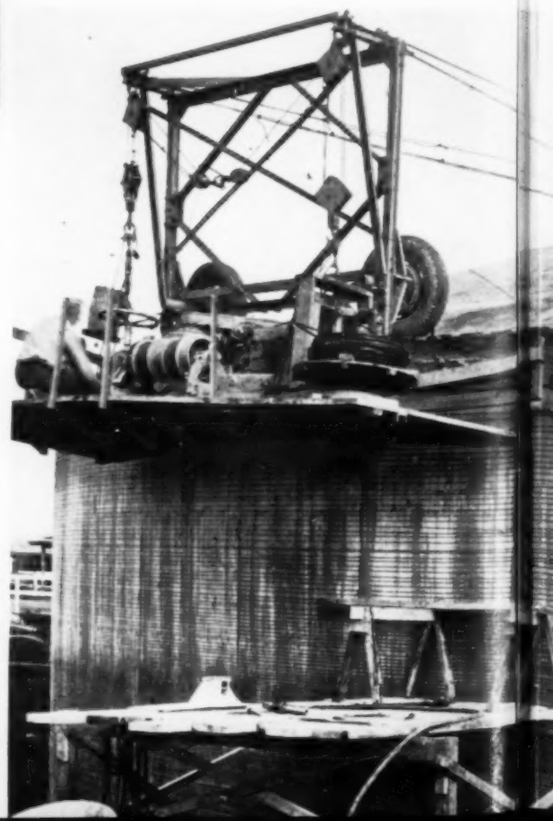
Prestressed Concrete Tanks



WIRE-STRESSING MACHINE suspended from rolling carriage travels around cylindrical tank winding continuous spiral of cold-drawn steel wire which is mechanically stressed to desired initial tension. Two men take care of all operations on wire-stressing machine.

TO GAIN A DOUBLE ADVANTAGE: (1) Reduce the amount of steel required for prestressed concrete tanks, and (2) minimize the effect of loss of tensile prestress in circumferential steel bands resulting from shrinkage and plastic flow of the concrete walls, the Preload Co. has developed a machine which applies stressed high-tensile steel wire to cylindrical concrete structures, thus making it possible to design and build prestressed tanks of decidedly greater economy and structural stability than those formerly equipped with turnbuckle girth rods, as described in *Construction Methods*, Aug. 1943, p. 68. The machine recently wrapped 18 mi. of stressed 0.14-in. wire at 150,000-psi. tension in three days around two water tanks, of 400,000- and 500,000-gal. capacity, at the Columbus, Ohio, warplane plant of the Curtiss-Wright Corp. Accompanying photographs illustrate the opera-

COIL OF WIRE (below) mounted on wire-stressing machine is unreeled as machine travels around tank applying continuous spiral. Resistance mech-



THIN CONCRETE SHELL of 400,000-gal. tank (below), with walls 16½ ft. high, 5 in. thick at base and 4 in. thick at top, is put into compression as wire-stressing machine winds spiral of 0.14-in. wire under 150,000-psi tension around outside of cylinder. Thin walls are built of pneumatically applied concrete shot from inside against single set of exterior forms. After wrapping with stressed wire has been completed, wires are covered with dense coat of pneumatically applied mortar about ¾ in. thick.

tion. Previously, the wrapping machine had applied stressed steel wire to about eight other tanks, notably three 1,667,-000-gal. water storage tanks for the City of New London, Conn.

Wire-Stressing Machine

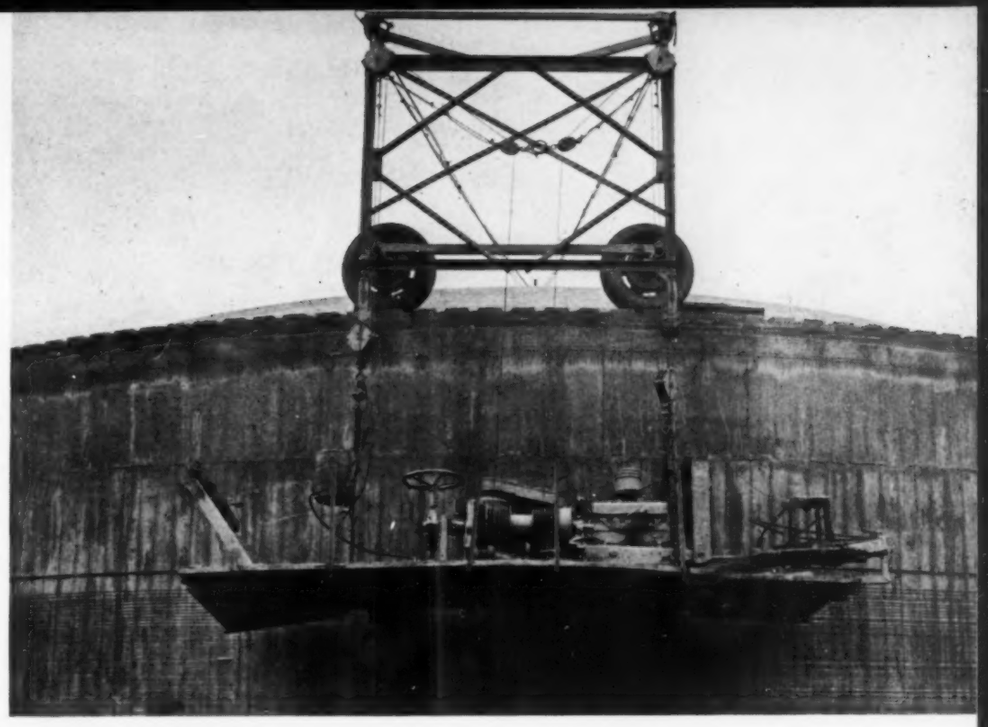
Constructed of such parts as could be acquired readily, the pioneer-model wire-stressing machine, illustrated by the photographs, hangs from a supporting carriage mounted on the rim of the tank. Tie cables to a center pin extending through the center of the dome roof of the tank hold the supporting carriage to its track as it rotates around the rim.

Mounted on the machine is a reel to carry the coil of wire to be wrapped around the tank. The wire passes from the coil to a resistance mechanism which provides absolute control of the stress imparted to the wire. Winding of the wire starts from an anchor at the bottom of the tank and proceeds spirally around the walls. The machine operates at a working speed of about 3 mph., requiring only a few hours to apply the mileage of wire needed on an ordinary storage tank.

Benefits of High Stresses

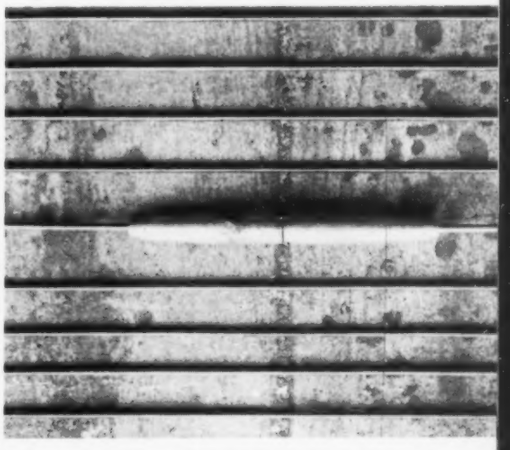
Shrinkage has an important effect on the serviceability of concrete tanks. Evaporation or withdrawal of moisture from concrete allows the material to shrink. A tank which is kept full of water will not shrink. In fact, saturated concrete expands slightly; but, when concrete is thoroughly dried, it undergoes considerable shrinkage. If a water tank is allowed to remain empty, shrinkage almost cer-

(Continued on page 132)



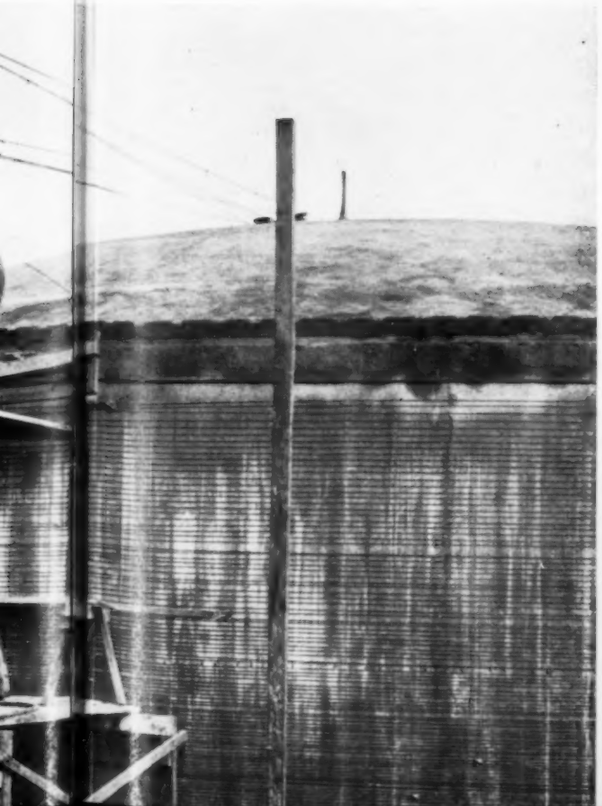
TWO SETS OF HOISTING TACKLE raise wire-stressing machine as winding proceeds from bottom to top of tank. At right on machine platform is reel on which wire coil is mounted.

ANCHOR BOLTS installed in concrete at every twelfth to fifteenth spiral are indicated by **HOMER GAFFORD**, wire-stressing supervisor, The Preload Co., to **JOHN RITTER** (left), superintendent in charge of building two tanks at Curtiss-Wright plant.

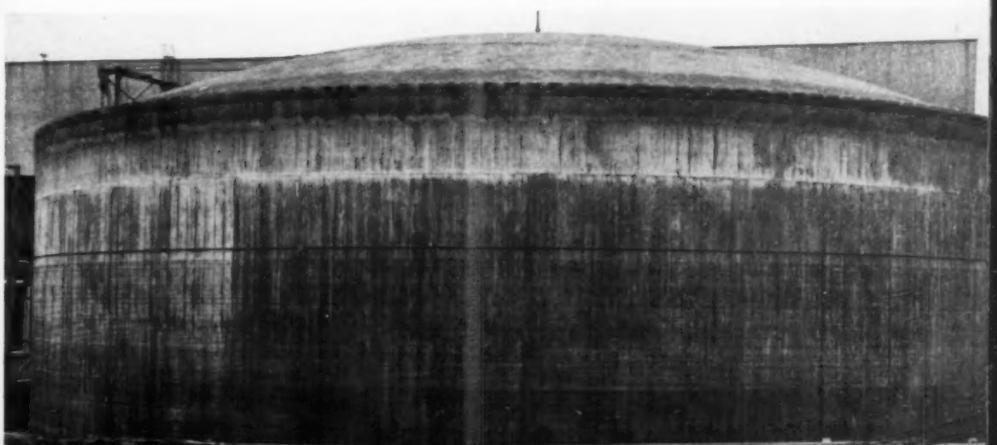


"TORPEDO" SPLICE of spring-and-wedge type couples wires joined to make continuous spiral from bottom to top of prestressed concrete tank.

CYLINDRICAL TANK (below) of 500,000-gal. capacity, 65 ft. in diameter and 20¼ ft. high, is wrapped with steel wire stressed to 150,000 psi. This tank has walls of pneumatically applied concrete 4 in. thick at top, increasing to 6 in. at base. After wire has been wound, it is covered with dense mortar coat, likewise applied pneumatically.

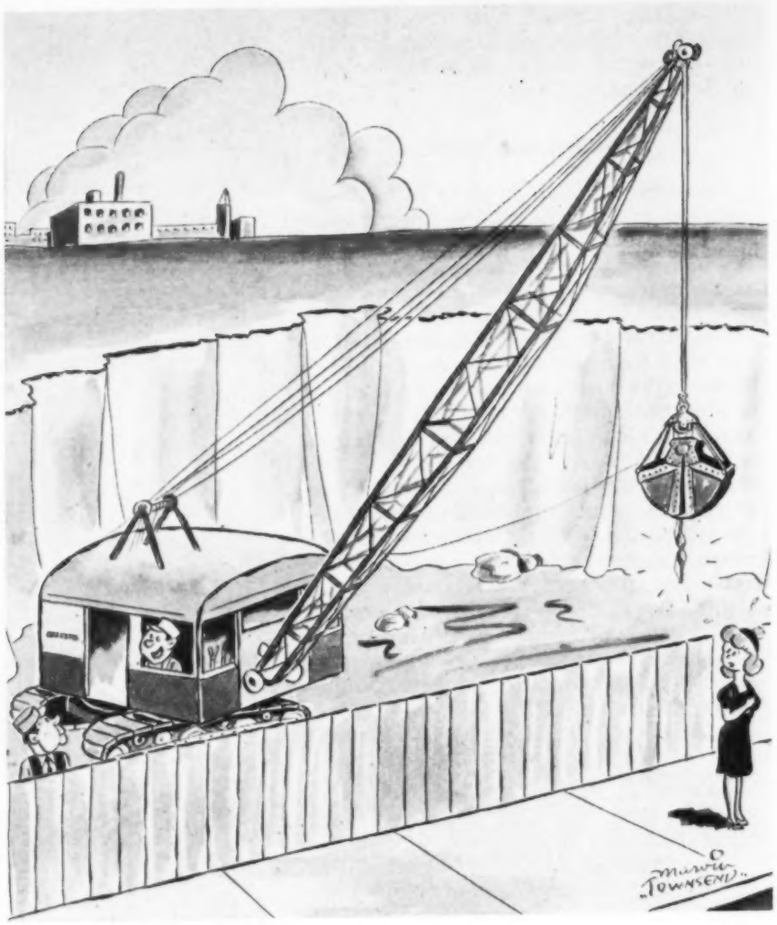


anism imparts accurately controlled tension to stressed wire. Tie cables to center pin in dome roof hold supporting carriage on circular path.



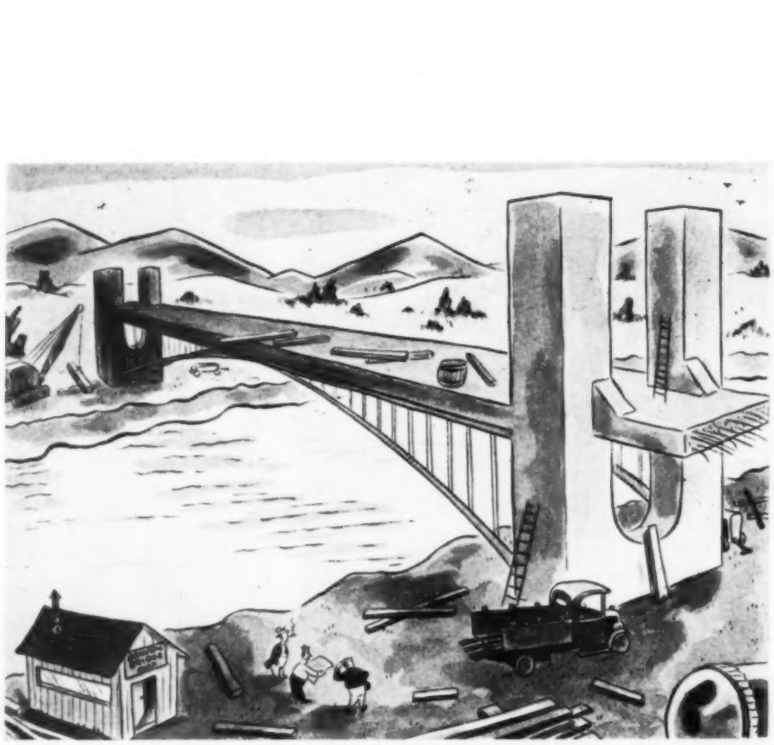
THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS



"Now who's the best crane operator?"

"Isn't it about time you quit signing autographs and started digging?"



"It's upside-down in the blueprints, ain't it?"

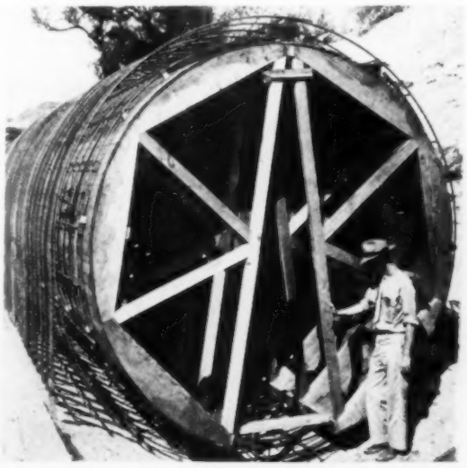
Madera Canal Extended

And Siphon Built at River Crossing

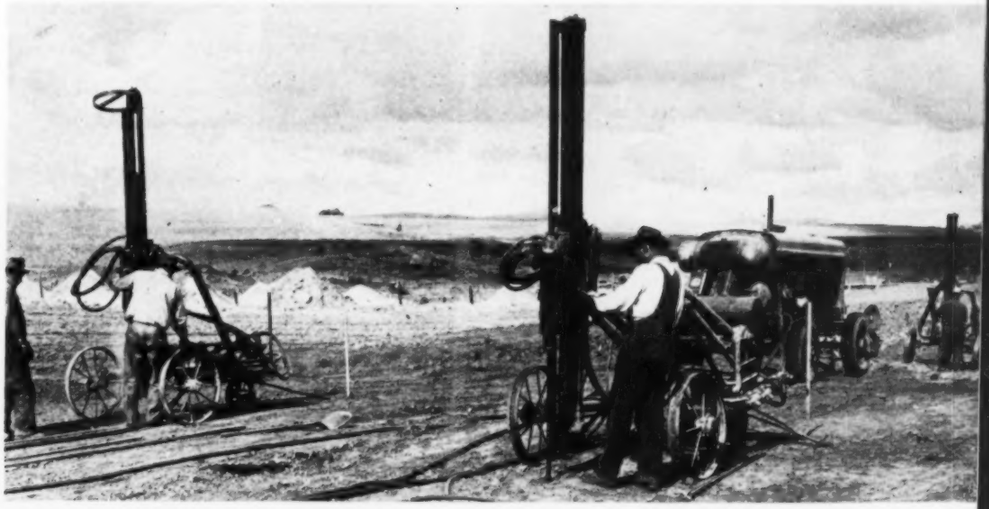
TO MAKE WATER AVAILABLE to 25,000 acres of Madera County, Calif., land that is not now irrigated, the Madera Canal will cut through foothill country from Friant Dam to the agricultural lands. Earth and rock are now being moved to make way for the concrete and steel of an additional 11-mi. section, which is being built on two schedules. Larsen Bros. and Harms Bros. of Sacramento are extending the canal to the Fresno River, where Oberg Bros. of Inglewood, are building the Fresno River siphon and adjacent structures. The siphon is 10.5 ft. I.D. and its length, including transition sections, is 1025.5 ft.

Bids on the final section of the canal have been requested by the U. S. Bureau of Reclamation.

FORMS FOR FRESNO RIVER SIPHON take shape rapidly as contractor races to get this portion of canal in clear before winter rains turn river into raging torrent. Well-points along left side of excavation enable contractor to form and pour siphon barrel in the dry.



INNER FORM and reinforcing steel are in place for section of monolithic siphon to carry canal under Fresno River.



HEAVY EARTHMOVING EQUIPMENT (below) like this tractor and carryall scraper is used to cut pathway for water in Madera County.

AFTER BURDEN is stripped from rock section of Madera Canal right-of-way, wagon drills move in to prepare way for dynamite.

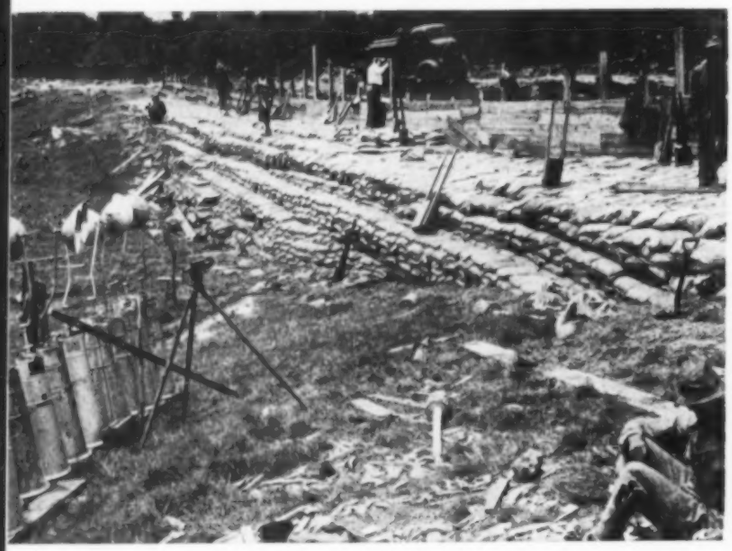
Midwest Floods Furnish *Training for Army Engineers* In Rescue and Defense Operations

BATTLING FORCES OF NATURE during the floods last summer in the Middle West, Army Engineer troops received valuable first-hand experience in meeting emergency conditions. With technical operations directed by Major General Eugene Reybold, Chief of Engineers, a total of 37,895 troops accomplished tremendous savings in lives and property. Represented in this total were members of practically every branch of the armed forces.

Heavy earth-moving equipment, amphibious jeeps, assault boats, motorized pontons, and other pieces of floating equipment were pressed into service to protect levees, defense plants, and other installations and to execute some of the most spectacular rescue work in the history of flood-stricken areas. No artificial

Photos by U.S. Army Signal Corps

SANDBAGGED TIMBER BULKHEAD (below) is constructed opposite angle in Arkansas River north bank levee where scour occurred. Building 177-ft. bulkhead is 95th Engineer General Service Regiment, recently returned from Alaska Highway. Carbide lights are assembled at left to facilitate night work.



LIVESTOCK is evacuated from flood-threatened areas along Mississippi River by means of Engineers' floating equipment which was quickly called into service for emergency.

LOW-SLUNG WOOD PLATFORM (below), mounted on broad-tired wheels and hauled by wheel tractor, delivers sand bags for topping out levee.

TROOPS REINFORCE weak spot in levee along White River (below). Millions of sand bags were

AMPHIBIOUS JEEP carries flood victims to safety. Note rowboat towed behind vehicle whose mobility under all types of conditions is credited with saving numerous lives.

SOLDIERS NAVIGATE rubber boats along East Little Rock, Ark., street. These boats helped evacuate families from homes which were partially submerged by rising waters of river.

conditions could have provided a field problem of the same magnitude and realism as the flood waters of the Mississippi Valley which, in many points, surpassed 100-yr. records.

In past floods most of the levee and rescue work was done by civilians under the direction of the Engineers, but because of prevailing labor shortages this time troops were called on to assist. In general the troops were employed in strengthening levees and evacuating civilian inhabitants. A total of 51,430 people were evacuated primarily by troops, while additional thousands were evacuated by the Red Cross and other agencies. It is estimated that at least one-half of the 2,476 people rescued from dangerous points during the flood might have been lost if men and equipment had not been available. Soldiers placed more sand bags on the levees than anyone dreamed could be put on. Amphibious jeeps, many of them driven by women, played an important part in the rescue operations.

Affected areas were in Oklahoma, Arkansas, Missouri, Kansas, Illinois, and Indiana. Highway and railroad traffic was generally disrupted throughout the six states. More than 200 breaks and crevasses were recorded in the levees, but most of them were of local drainage districts and in poor condition. There was not a single break in a levee built by the Army Engineers and completed to their designed specifications. Little damage to structures was reported.

When the 27-in. water main supplying Fort Smith and Camp Chaffee, Ark., was broken by the flood, the city of 40,000 people and the large cantonment were left with only four days supply of water. The Engineers improvised a temporary 8-in. pipeline to Fort Smith. After solving many difficult engineering problems and using pontons, three such lines were

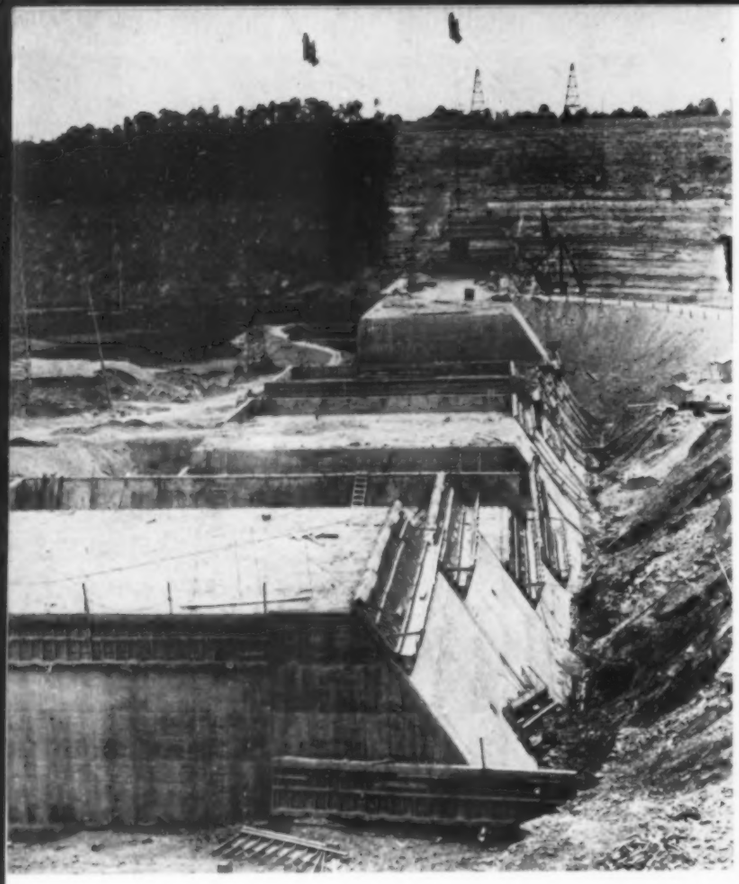
(*Continued on page 128*)

FLOOD WATERS SUBMERGE approach to bridge across Missouri River near Kansas City, Kan.

SMALL TIMBER BRIDGE is built on road to Lenox, Tenn., to help maintain key transportation lines in flooded district. Road was raised an average of 2 ft. for approximately 800 ft. by small dragline using material obtained from roadside ditches. In background bulldozer blades and compacts fill.

filled and placed by Engineers. Here Lt. Col. R. H. Nicholson inspects work of 359th Engineers.

BULLDOZER (below) is used to throw loop levee around threatened break on White River in Arkansas. Troops of 364th Engineer General Service Regiment, skilled in use of equipment, make repairs.



Light, Flexible, Sheets of *Absorptive Lining* Stapled to Panel Forms at *Norfork Dam*

Two previous articles on Norfork Dam have appeared in Construction Methods: Contractors' plant layout and concreting methods, October 1943, p. 62; aggregate preparation and batching plant, November 1943, p. 78.

ABSORPTIVE FORM LINING in flexible sheets which are light in weight and easily attached to the sheathing lumber with stapling guns has proved highly satisfactory to The Utah Construction Co. and Morrison-Knudsen Co., Inc., contractors for Norfork Dam, U. S. Engineer structure ½ mi. long, containing 1,500,000 cu. yd. of concrete, on the North Fork River in Arkansas. Absorptive lining is required for all exposed concrete surfaces, principally the upstream and downstream faces of the dam. The form lining used on the job consists of a thin sheet of absorptive material, resembling tough cardboard in appearance, faced with cotton fabric cemented to the porous fiber backing. When the panel forms are stripped from the upstream and downstream faces of the dam, the lining adheres to the concrete, from which it can readily be removed while the lining remains wet.

Specifications require that the concrete be kept continually wet for a period of 21 days. The absorptive lining peels off easily when wet, any time during the first two weeks, and little difficulty is experienced in removing it during the third week of the three-week period. After the absorptive lining has been allowed to dry for a week or more, it sticks to the concrete and is difficult to remove. During the winter months, the lining is required to be left in place on the concrete for three weeks as a protection against freezing, and no curing water is used in temperatures below 35 deg. F. Even with no curing water, the lining strips readily until it has been exposed for two weeks.

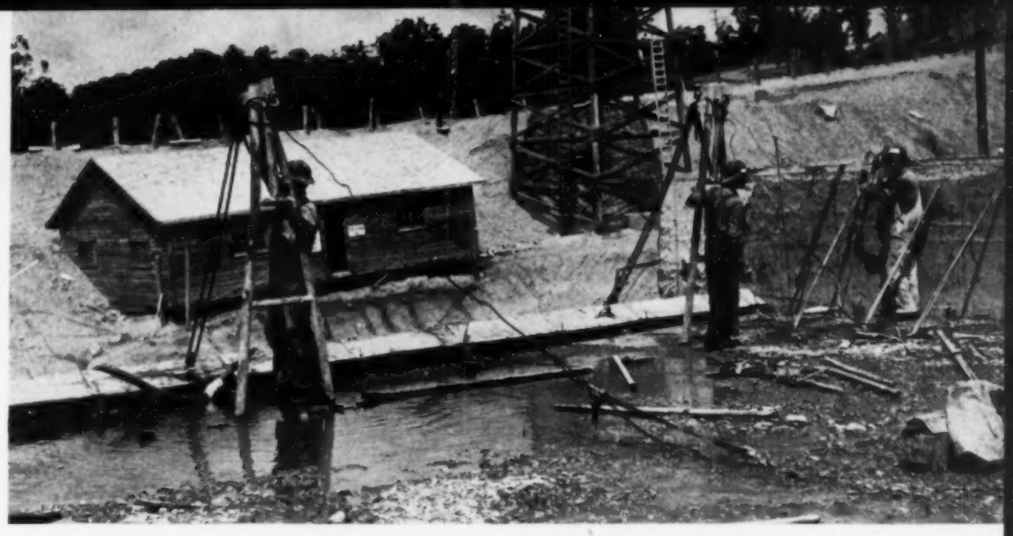
Dam Forms—Panel forms for the upstream and downstream faces are made the full width of the monoliths, generally 48 ft. long, with a few 54 ft. and 40 ft. in length, as indicated by a plan and elevation of the dam published with an earlier article on the project, CONSTRUCTION METHODS, October 1943, p. 64. Concrete is

ABSORPTIVE FORM LINING in flexible 4x6-ft. sheets (below) is used on all exposed concrete surfaces at Norfork Dam. Sheets come in flat packages containing 25 each.

POROUS FIBER SHEET (below), faced with fabric cemented to absorptive backing, provides lightweight flexible lining for concrete forms. Fabric is pulled loose at corner to show two-ply construction of form lining material.

STAPLING GUN (below) drives staples with ⅜-in. legs to attach absorptive lining to sheathing lumber on forms. Staples are spaced about 2 in. apart along edges of sheets and about 6 in. apart in interior areas.

WHEN FORMS ARE STRIPPED, absorptive lining adheres to concrete, from which it may be peeled by hand within two weeks, while material remains wet.

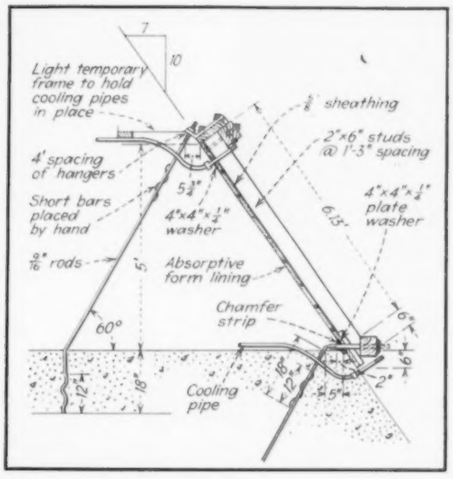


SET IN POSITION, with chain hoists attached to eyebolts in top wale. A-frames are made ready to raise form panel.

placed in 5-ft. lifts. An accompanying drawing shows the construction of a form panel for the downstream face. Portable A-frame derricks, equipped with Coffing ratchet-lever chain hoists, are used for raising all panel forms on the job, as shown by several of the accompanying photographs.

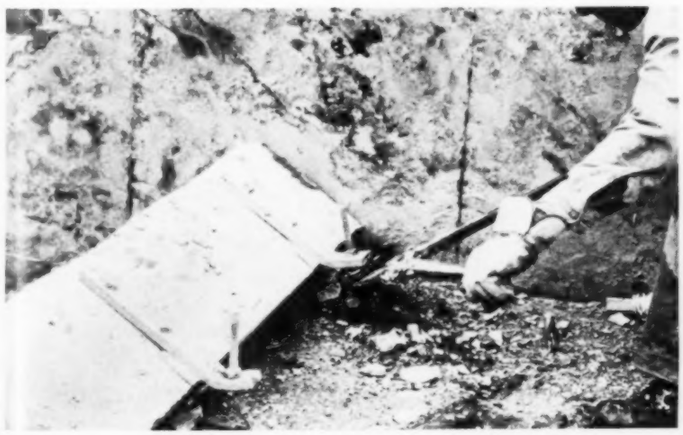
When a form is stripped any small bits of lining which may remain on the form are quickly and easily removed after the panel has been raised. The panel then is lined with fresh absorptive material, known as Hydron, manufactured by the U. S. Rubber Company. To meet the specifications, which permit no horizontal joints between sheets of lining material, the panels are lined to the full height of a

PICKED UP AND CARRIED BY ONE MAN, tubular A-frame derrick is moved into position to raise form panel. Chain hoist used with A-frame is transported separately.

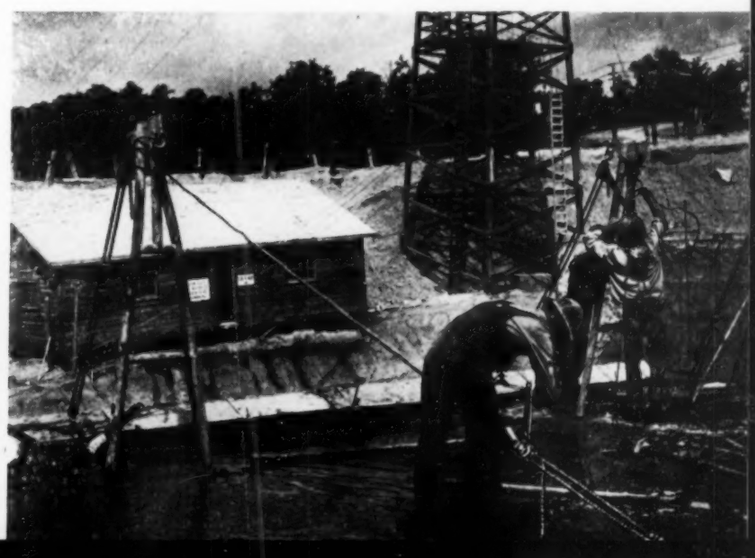


PANEL FORM for downstream face is anchored at base by short bars on 2-ft. centers and at top by long bars on 4-ft. centers. Temporary pipe braces, not shown in this drawing, are installed to support top of form until part of concrete lift is placed. Panel 50 ft. long is lined with absorptive material for full length of 48-ft. monolith. Permanent built-on walkway with handrail, standard feature of downstream panels, is omitted from this sketch.

PREPARING TO RAISE FORM PANEL (below), workman cuts top tierods with Porter bolt cutter.



WIRE-ROPE BACKSTAY (below) from A-frame is drawn tight by chain jack hooked to U-rod embedded in concrete.

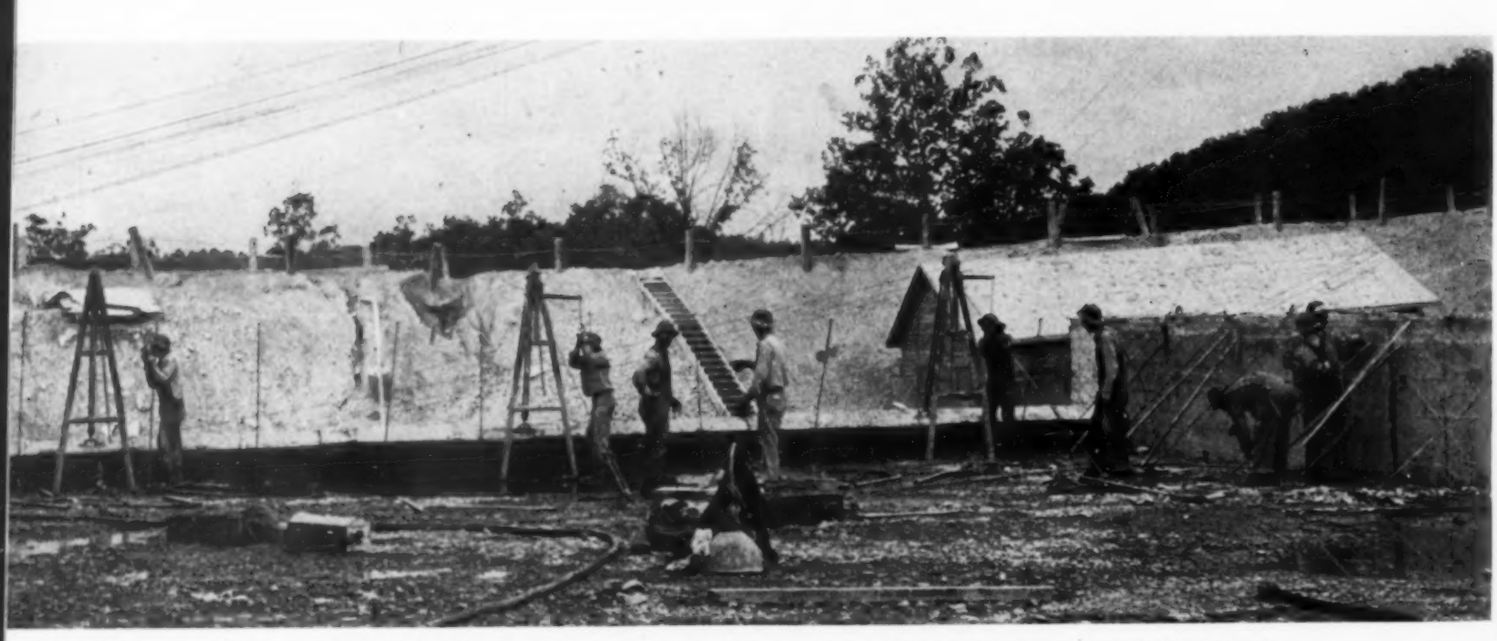


RATCHET LEVER CHAIN HOISTS on A-frame derricks raise form panel to position for next 5-ft. lift.

lift with 6x4-ft. sheets. The lining is 0.08 in. thick, and a 4x6-ft. sheet weighs about 7½ lb. Two men can fit the sheets to an entire panel and complete the stapling in an hour.

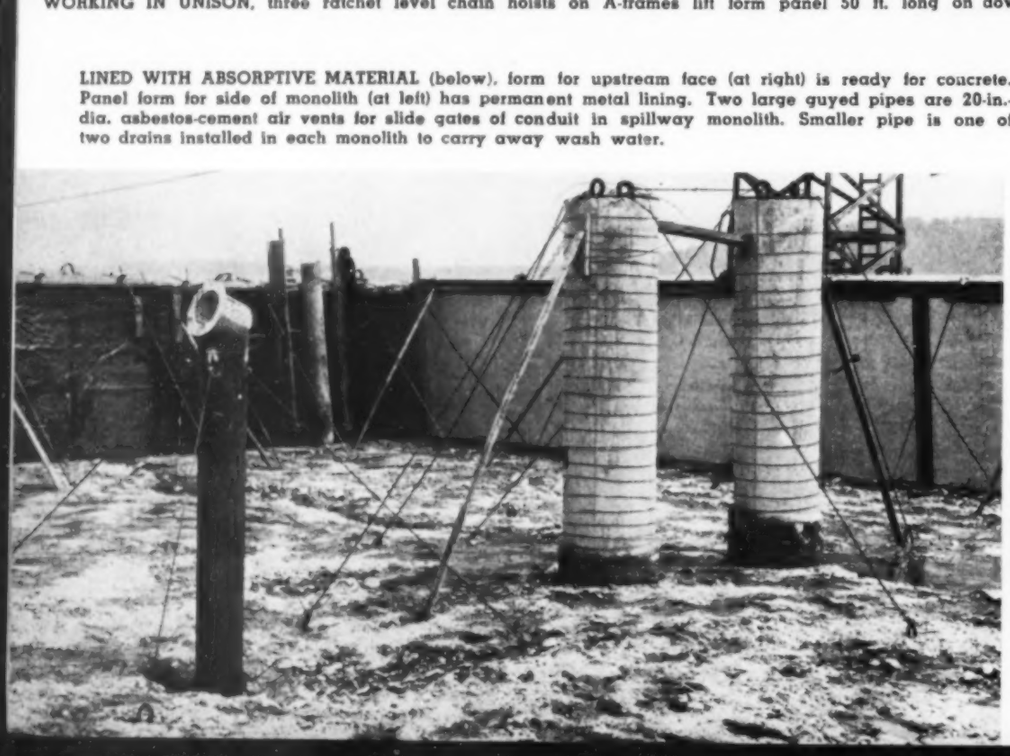
Exposed concrete surfaces on the project require about 800,000 sq. ft. of absorptive lining. Before being approved for use on the job, the lining was subjected to full-scale tests on lower lifts of monoliths, later covered by backfill. Despite its light weight, the lining has proved effective in producing a dense concrete surface of uniform texture free from pits and voids. The lining is highly absorptive to air and water. Easy handling, fitting, stapling and removal of sheets have won the approval of the men in charge of the job for the contractors.

Within two weeks after form stripping, the sheets can be peeled from the concrete surface by hand without use of tools. If the absorptive lining is allowed to remain on the concrete for more than two weeks without wetting, it has to be scraped off with putty knives or similar implements.



WORKING IN UNISON, three ratchet level chain hoists on A-frames lift form panel 50 ft. long on downstream face of 48-ft. monolith.

LINED WITH ABSORPTIVE MATERIAL (below), form for upstream face (at right) is ready for concrete. Panel form for side of monolith (at left) has permanent metal lining. Two large guyed pipes are 20-in.-dia. asbestos-cement air vents for slide gates of conduit in spillway monolith. Smaller pipe is one of two drains installed in each monolith to carry away wash water.



Men in charge of the project for the U. S. Engineers, Little Rock District, and for the contractors were listed in the earlier article already mentioned. Capt. John L. Kemple of the Corps of Engineers is resident engineer, and C. B. (Woody) Williams is project manager for The Utah Construction Co., Ogden, Utah, and Morrison-Knudsen Co., Inc., Boise, Idaho.

A fourth article on Norfork Dam, describing methods of controlling temperatures in concrete batches and in mass concrete of structure, will appear in the March number of Construction Methods.

Army Engineers Develop

Camouflage Techniques

For Passive Defense

CAMOUFLAGE FOR PASSIVE DEFENSE is a primary function of the U. S. Army Corps of Engineers. Deception, concealment and disguise are the chief weapons. On fighting fronts dummy landing fields are used to simulate the fields in actual operation. Artificial fog and smoke are sometimes used to decrease the visibility of weapon emplacements, field fortifications, personnel shelters, and other vital permanent installations on existing airfields.

Mesh nets are used to camouflage tanks, half-tracks, gun carriages, and trucks. The nets not only hide the object but help to break the revealing shadow pattern which is often more difficult to hide than the object itself. Wide-mesh camouflage nets, formerly employed, had to be garnished with strips of cotton or burlap to cast enough shadow to break up the regular lines of the military equipment they concealed. Now in use are small-mesh shrimp nets that need no garnishing. They are more efficient because there are no trailing ends to catch on projecting machinery. The new net, easily carried as part of the machine's equipment, can be unrolled quickly and draped over equipment even on the shortest halt, becoming one of the best passive defenses for even the largest of weapons.

IN LESS THAN FIVE MINUTES, truck is hidden from "enemy" planes on maneuvers out of Davis-Monthan Field at Tucson, Ariz., as Camouflage Engineers train to use whatever materials are at hand to conceal equipment.

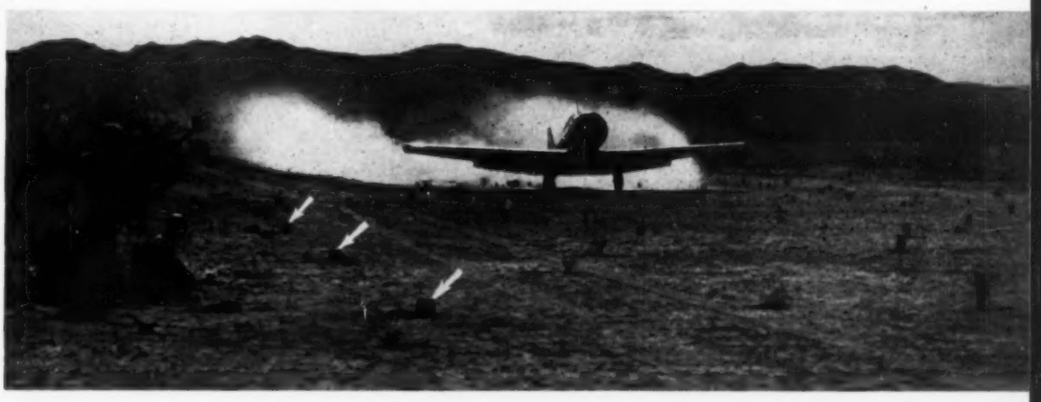
U.S. Engineer Photos

CAMOUFLAGE ENGINEERS work on model B-24 which has been built strong enough to support men as they are trained in solving concealment problems.

DUMMY ANTI-AIRCRAFT GUN is partially concealed with garnished net to give impression of poor camouflage job. Dummy gun is mounted on dummy landing field located several miles from acutal camouflaged field.

MOUNTED ON "CHRISTMAS TREE" STANDARDS (below) for concealment purposes, trees and shrubbery are cleared from emergency landing field for friendly plane. Army Engineers who build fields on fighting fronts assume that enemy has already made aerial photographs of terrain, so position of existing undergrowth is carefully marked and each bush or three replaced in same position.

"FRIENDLY" PLANE (below) rolls into emergency landing field built and concealed by Aviation Engineers attached to 2nd Air Force. Cans lining bordering field contain oily rags which can be quickly lighted at night to allow landings.



ON LEVEL CASTING PLATFORM at building site, carpenters construct wooden forms for three-hinged concrete arch ribs 105 ft. long. At near end of forms, note sheet metal molds for rounded ends of ribs.

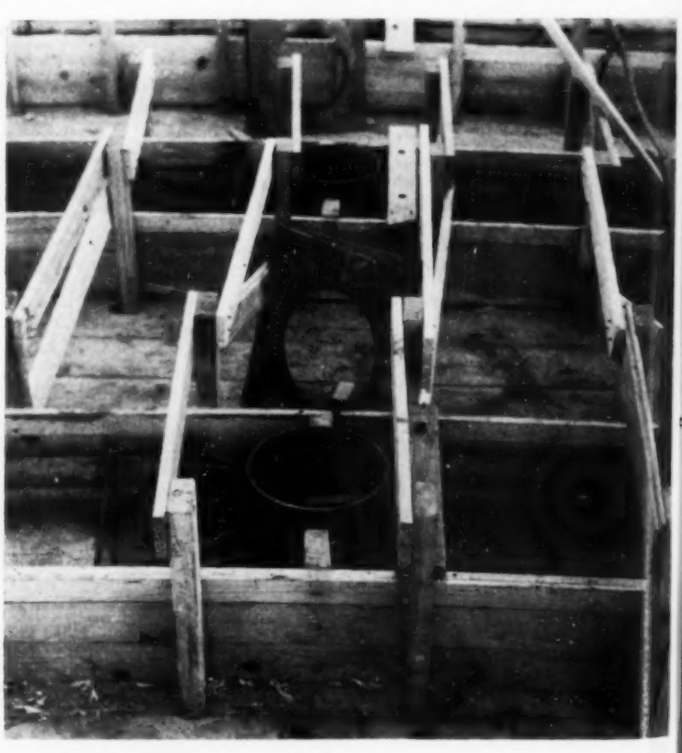
ELECTRIC WELDER fuses stirrup loops to longitudinal rods of steel reinforcement for concrete rib. Beyond rib forms are concrete piers containing rectangular recesses in which haunch seats will be placed.

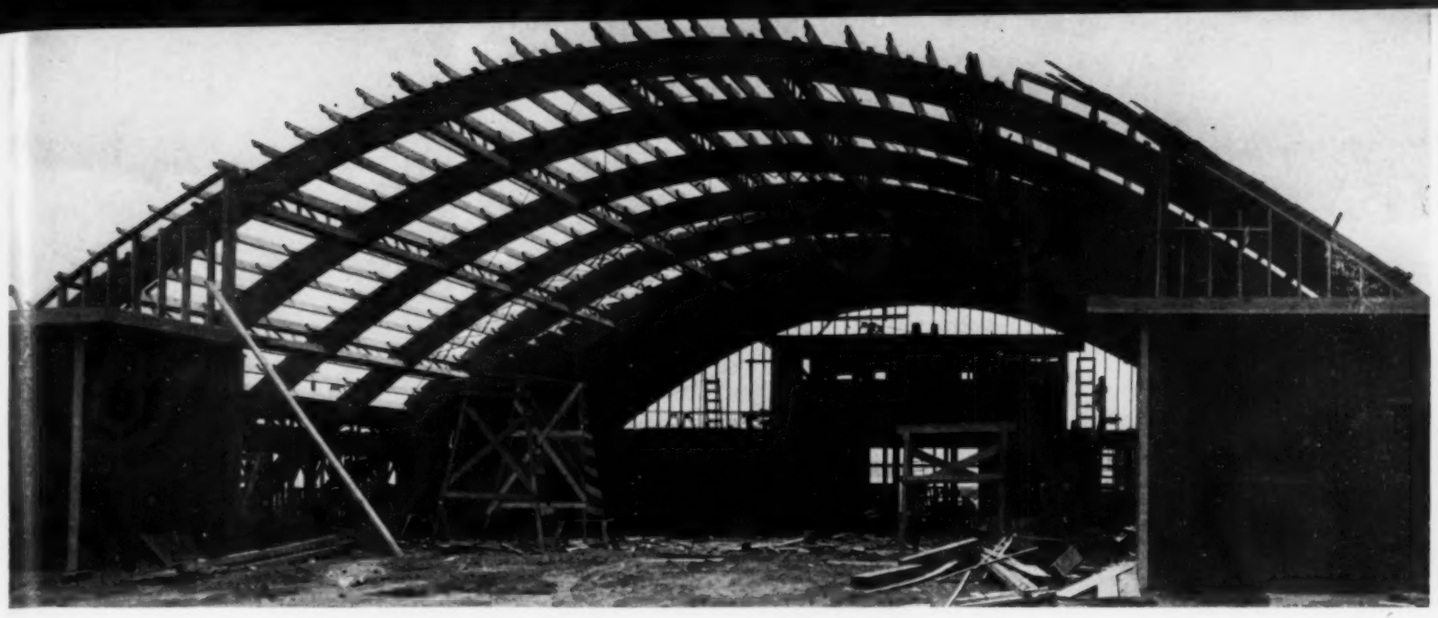
Three-Hinged Concrete Arch Ribs

PRECAST IN FLAT POSITION

CENTER HINGE (below) is made up of 10-in.-dia. pipe pin attached to one-half of rib and two hinge plates fastened to anchor bolts in opposite half. Drilled holes in template boards hold anchor bolts in position.

PIPE PIN (below) of center hinge is welded to reinforcing steel of one-half of rib, at left. Pin also has welded anchor fingers extending beyond first stirrup loop of reinforcement. Note 2-in. wooden bulkhead between two halves of rib.





THREE-HINGED CONCRETE ARCH RIBS of 91-ft. span and 25-ft. rise support roof of theatre at Naval Air Station. Center hinge is made with 10-in. pipe pin and two hinge plates. Haunch hinges consist of rounded ends of ribs set in specially formed pier seats and coated with lubricant to allow necessary movement for hinge action.

TO SUPPORT THE ARCH ROOF of an auditorium-gymnasium building at an auxiliary air station of a vast Naval Air Training Center in the Southwest, Robert & Co., engineer-architects, designed unusual three-hinged concrete arch ribs which were precast in flat position by Brown-Bellows-Columbia, contractors for the Bureau of Yards and Docks, on a temporary wooden platform laid out directly on the building site between the two rows of arch piers. Use of reinforced concrete in the ribs reduced the demand, extremely heavy at the time, for laminated timber arches, and skillful design of the hinges entirely eliminated the need of special steel fittings. Details of rib forms and fabrication of reinforcing steel and hinges are indicated by accompanying photographs.

With a span of 91 ft. between centers of haunch hinges and a rise of 25 ft. at the crown, each of the ribs for the arch roof has an overall length of 105 ft. 2 in., made up of two halves hinged at the center of the span. Both the center hinge and the haunch hinges are unusual in design. The center hinge consists of a 10-in.-dia. pipe pin, welded to the reinforcing steel of one-half of the rib, and two hinge plates fastened to anchor bolts of 1-in. pipe which are welded to the steel bars in the opposite half. Hinge plates have 10-in.-dia. holes fitting over the pipe pin. The ribs are 9½x19 in. in cross-section.

Haunch hinges dispense entirely with steel fittings. These hinges are of socket type, with semi-cylindrical ends of the ribs fitting into matching seats which permit some rotating motion. Sheet metal molds, shown by photographs, were used by the contractors to form the rounded ends of the ribs. Matching seats were made by casting concrete against the finished ends of the ribs. Rectangular recesses for the seats previously had been formed in the reinforced-concrete piers which support the ribs, and the seat blocks were made to the proper dimensions to fit into the recesses, where the blocks are grouted in

(Continued on page 140)

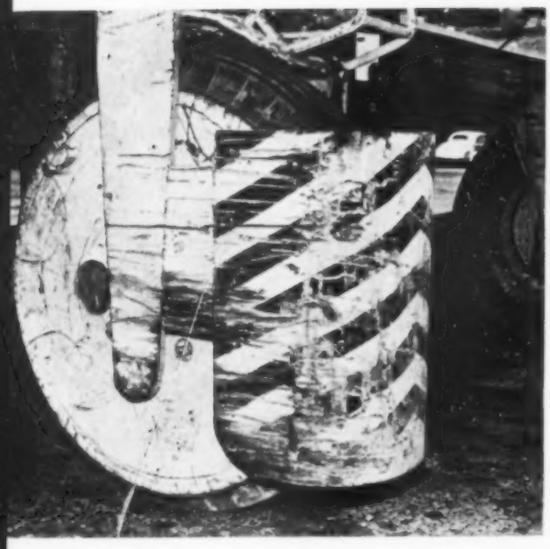
AT HAUNCH HINGE, rounded end of precast rib is coated with graphite grease to permit some rotation in socket seat of concrete pier. Rib has rectangular cross-section, 9½ x 19 in.

SHEET METAL MOLD (below) forms semi-cylindrical end of concrete rib. Rounded end of rib fits into matching socket seat of haunch hinge, as shown by photograph at left.

PULLED ON SKIDS by Caterpillar tractor, 14x20-ft. structure is moved to new position on North Pacific Island for use by Army Engineers.

SPECIAL CLIP, invented by ART SMITH, rigger for Permanente Metals Corp., holds prefabricated deck beams in place. Previously beams were lowered into place by slings, then made fast and beams pried up to remove slings, requiring 10 to 15 min. By using clip, beams can be held in place and tacked in few seconds.

Fore 'n' Aft



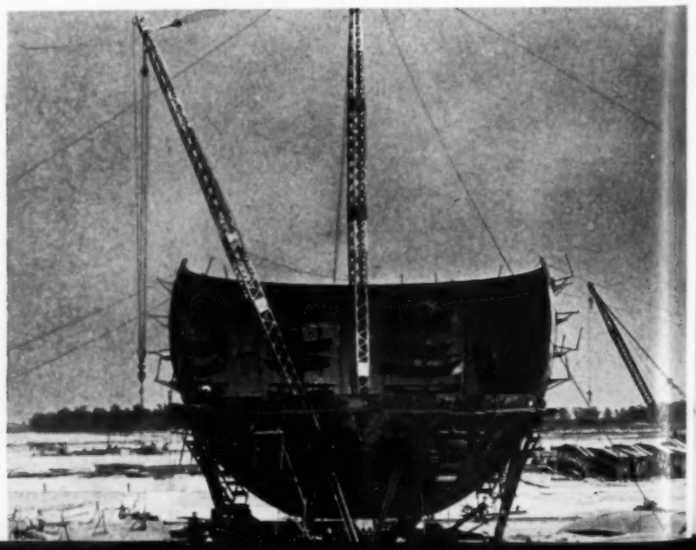
STEEL GUARDS AND WHEEL DISKS (left) protect tires of lumber carriers at Marinship Corp. yards in California. Scars and scratches on this guard, shown 30 days after installation, are evidence of constant beating formerly taken by tires.

HOW They Did It

CONSTRUCTION DETAILS For Superintendents and Foremen

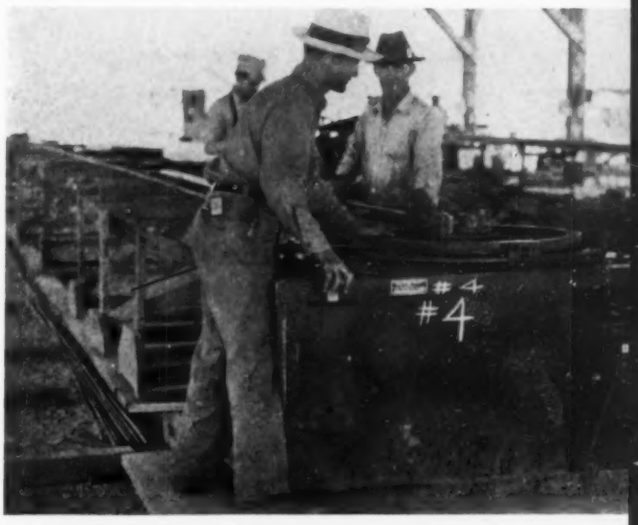
WELDED STEEL SECTIONS of big Hortonsphere are laid out on ground (left, below) at job site on Navy project, under direction of Bureau of Yards and Docks, and are erected (right, below) with aid of guy derrick.

U.S. Navy Photos



IMPROVISED GRAPPLE made up of four claw hooks on small clamshell bucket, handled by long-boom Bucyrus-Erie 1¾-yd. crane, piles cuttings for burning on CAA airport job of Frank Mashuda Co., Milwaukee, at Covington, Ky.

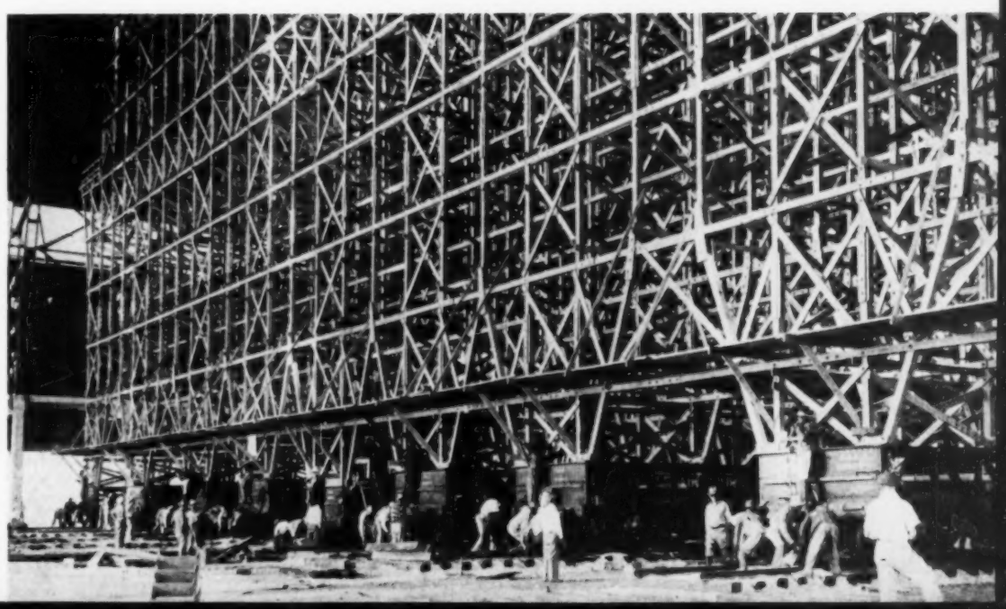
FRESH AIR FOR WELDERS inside 36-in. water main being laid from Santa Ana, Calif., southward is supplied by this 18-in. Sturtevant blower powered by four-cylinder LeRoi gasoline engine. Outfit is mounted on two-wheel trailer with frame made up of channel iron. Discharge pipe delivers into canvas tube that extends 5 ft. into steel water main in direction in which draft of air is desired.



REINFORCING STEEL for concrete barges (right) is bent by Kardong Bros. machine, here bending 1-in. round bar at Maritime Commission shipyard, McCloskey & Co., Philadelphia, contractor.

HUGE TRAVELING SCAFFOLDS (right), mounted on 18 railway gondola cars, enables Smith, Jacobs & Langston Co., contractors, to erect timber arch trusses for Navy blimp hangars, 1,000 ft. long, 297 ft. wide and 171 ft. high at crown. Cars are arranged in pairs on nine standard gage railway tracks across hangar. Traveler 91 ft. long, 212 ft. wide and 151 ft. high, requiring 480,000 ft. of lumber is moved to successive new setups by pinching wheels of cars with standard car movers. Traveler, carrying 8 stiff-leg derricks with 35-ft. booms to raise arch sections into place, has timber joints made with Teco split-ring connectors. It was built with four working platforms at different levels, each platform carrying two derricks. Car brakes (above) and wheel chocks were provided to check forward movement of scaffold and hold it in position at each new setup. Construction was directed by Navy's Bureau of Yards and Docks.

U.S. Navy Photos



PEACE OR WAR..

Your Cletrac Dealer can help you

equipment "Fit to Fig

THE CLEVELAND TRACTOR COMPANY • CLEVELAND, O

1 By supplying trained, expert service men to maintain and repair your Cletracs so that they will continue to provide dependable, economical performance.

2 By giving you the benefit of his years of experience in servicing machinery and help you do what often seems impossible in keeping equipment working.

3 By assisting you in making out the necessary forms required under government regulations to secure vital repair parts.

You'll find, too, that he carries as great a stock of parts as war conditions permit. War or peace, your Cletrac distributor is a good man to know.

BECAUSE he was properly geared-up in times of peace, your Cletrac distributor and members of his shop and field forces are making an important contribution to the war effort.

More than ever, he is placing service ahead of sales—and is ready to assist you keep your Cletrac equipment "fit to fight."

He stands ready to help you get the greatest possible use from your equipment:

ARMY E NAVY

• CLETRAC CRAWLER TRACTORS • GASOLINE OR DIESEL

HEAVY TIMBER PLATFORM outside tunnel provides storage place for unwelded rail and welding bed on which rails are lined up, four 1,000-ft. strings at a time, for welding.

NEW HEAVY-DUTY RAIL

Welded in

1,000-Ft. Sections

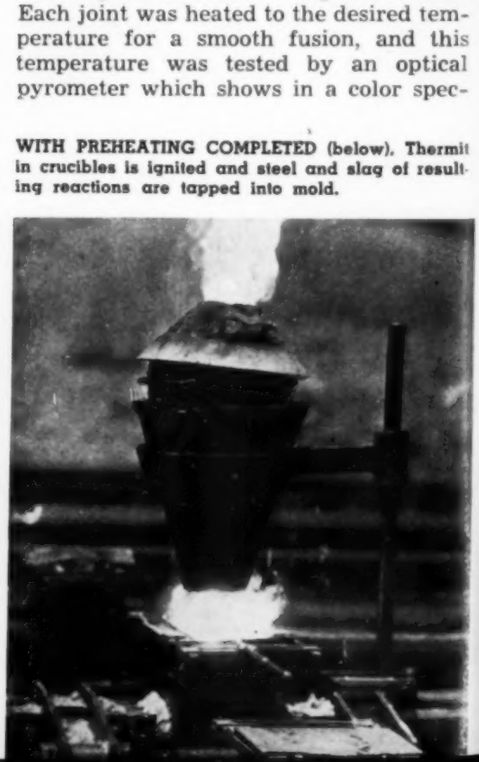
SKIDDED INTO MOFFAT TUNNEL

Page 76

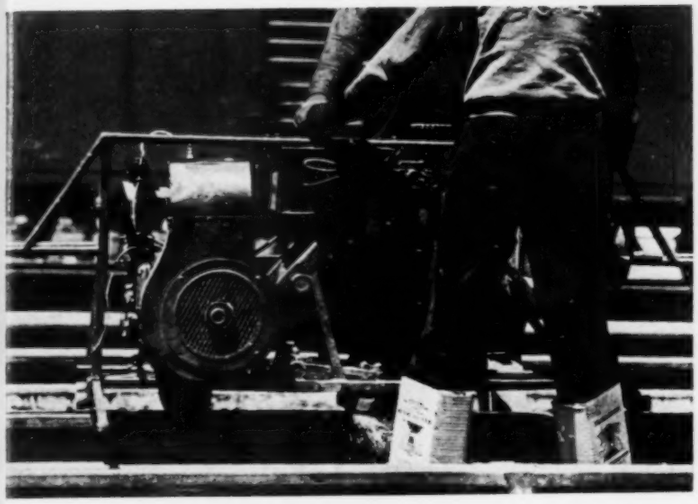
TRACK OF THE DENVER & SALT LAKE RAILWAY, on which trains of the Denver & Rio Grande Western Railroad operate through Colorado's 6.2-mi. Moffat Tunnel piercing the Continental Divide, has been reconditioned by replacing the original 112-lb. rail with new, heavy-duty 130-lb. rail, Thermit-welded outside the bore into continuous sections 1,000 ft. long which were pulled into place by a locomotive, with minimum interference to regular train movements. The project involved installation of about 72,000 lin. ft. of continuously welded rail.

Each of the sections to be joined was lined up outside for 23 separate welds. Each joint was heated to the desired temperature for a smooth fusion, and this temperature was tested by an optical pyrometer which shows in a color spec-

WITH PREHEATING COMPLETED (below), Thermit in crucibles is ignited and steel and slag of resulting reactions are tapped into mold.

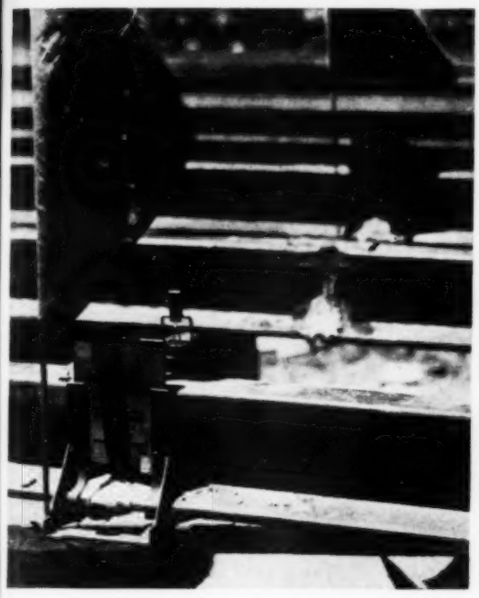


RAIL CLAMPS (below) are placed on joints, in multiples of four, to maintain alignment during subsequent operations. Next step in welding procedure is to put molds in place and begin preheating of joints for Thermit welding.



RUNNING SURFACES OF WELDS are ground to proper contour with heavy gas-driven grinder, after welds have cooled and mold boxes removed.

FLEXIBLE-SHAFT GRINDER is used to finish sides of welds on rail heads outside Moffat Tunnel.



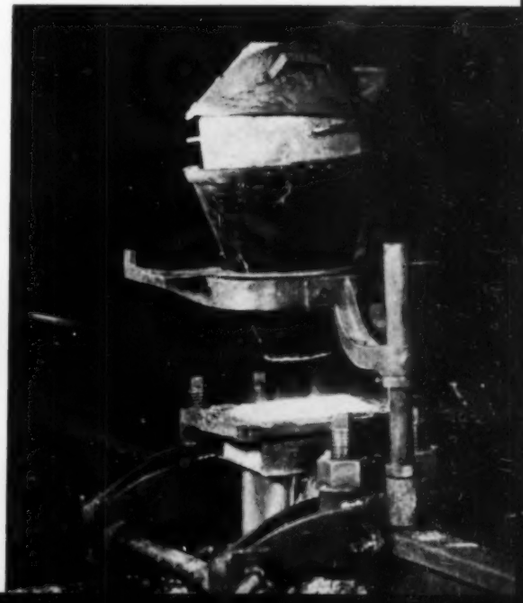
EACH COMPLETED WELD (left) is inspected by means of gamma - ray photos, since new design of Thermit weld is being installed.

AS EACH GROUP of four 1,000-ft. rails is welded (right), it is moved aside to make room for another group. Finished rails at left will straighten out when far ends are moved over.

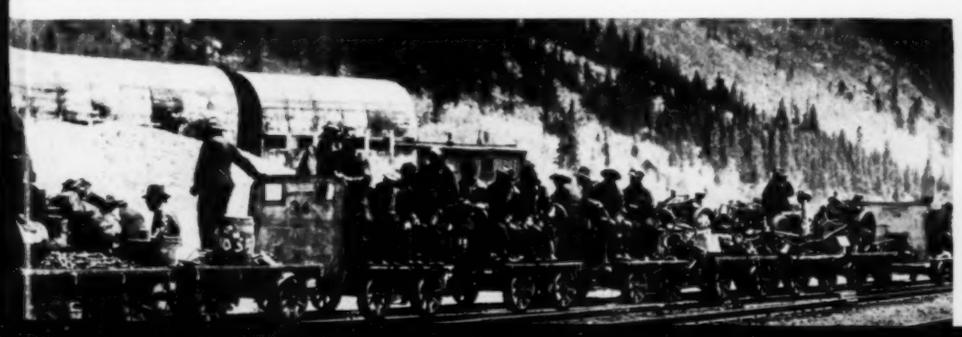
trum when the two sections attain the exact temperature desired for welding. A specially designed crucible then allowed the welding material to flow into the joint. The welds were then "radiographed" by means of a new X-ray photography process developed for this project. Using $10,000 worth of radium to take shadow pictures at right angles to the rail, the exact nature, depth and shape of defects, if any, were revealed.

Welded joints are not common in railroad track work, since contraction and expansion, due to changing temperature conditions, make them impractical. In the tunnel away from the sun, however, this objection does not apply. The installation of the new welding was directed by Frank Calkins, division engineer, Denver & Salt Lake Ry., and A. E. Perlman, chief engineer, Denver & Rio Grande Western R.R. Welding operations were in charge of Ray McBrian, of the Rio Grande department of engineering standards and research, and William Koontz, of the Metal & Thermit Corp.

CLOSURE WELDS (below) join 1,000-ft. rail sections inside tunnel by Thermit weld. Except for few insulated joints required for signal purposes, rails are welded into continuous lengths for entire 6.2 mi. of tunnel.



FINISHED RAILS (below) 1,000 ft. long are hauled into tunnel by spiking them to ties placed crosswise over existing track and skidding them in with small Diesel locomotive. With six or eight lengths inside, tunnel was closed to traffic and track gang and welding crew moved in to place long lengths in track and weld them together.



Present and Accounted For···A PAGE OF PERSONALITIES

NEW PRESIDENT of American Society of Civil Engineers is MALCOLM PIRNIE (left), New York consulting engineer and member of technical advisory committee to War Production Board.

ELECTED HONORARY MEMBER of American Society of Civil Engineers is FRANK T. CROWE (right), who has since 1939 been directing construction of Shasta Dam for Pacific Constructors, Inc. He was also in charge of construction of Boulder and Parker Dams on Colorado River.

Colorado River Aqueduct News

NEWLY ELECTED PRESIDENT of American Public Works Association is FREDERICK R. STORRER, city engineer of Dearborn, Mich., since 1930.

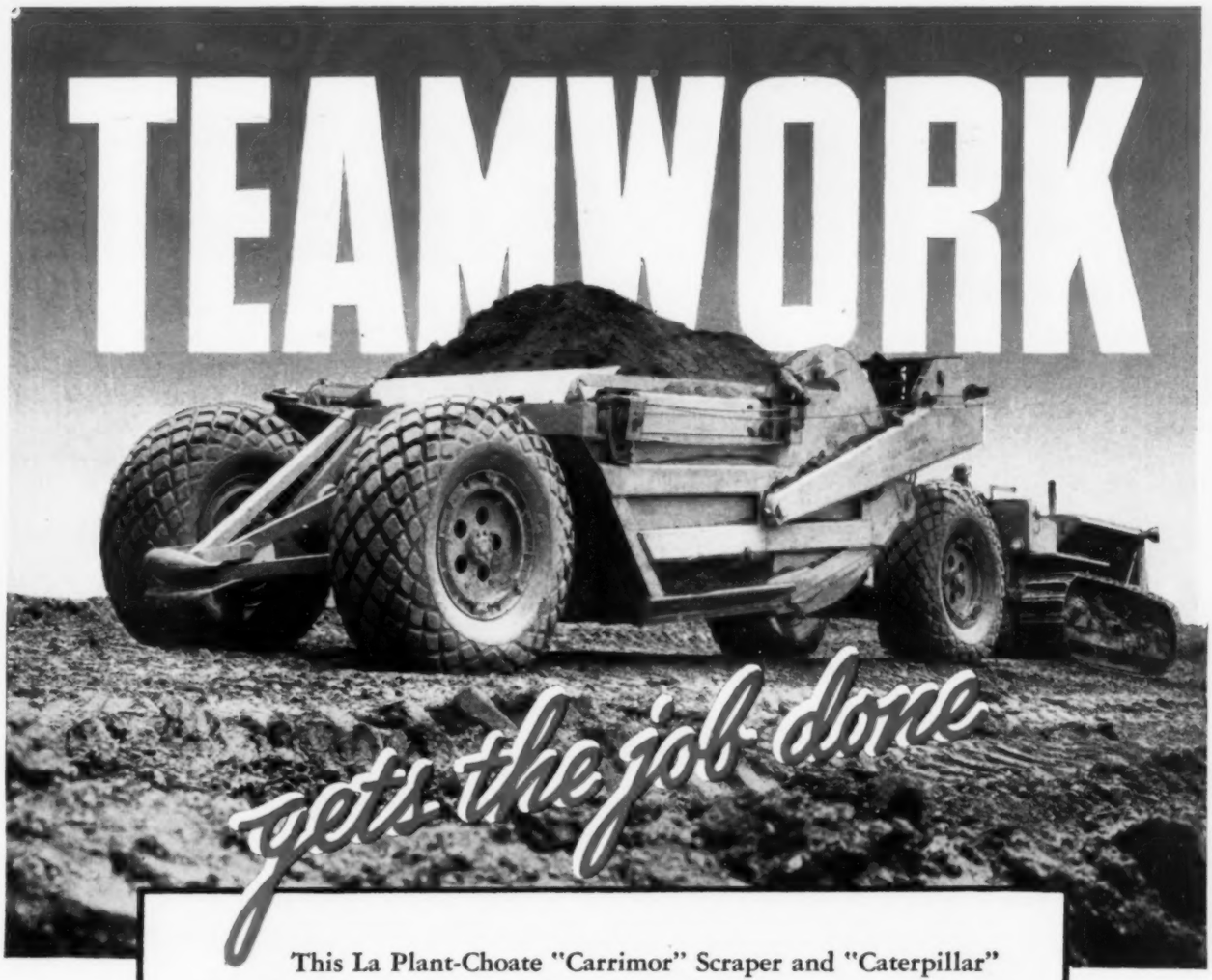
DISTINGUISHED SERVICE MEDAL for outstanding leadership of his division against Japanese on New Georgia Islands in Solomons is conferred on MAJOR GENERAL ROBERT S. BEIGHTLER (right), former Ohio director of highways. GENERAL GRISWOLD, Corps Commander, left, congratulates him.

CHOSEN TO HEAD American Welding Society in 1944 is DAVID ARNOTT, American Bureau of Shipping, of New York, who has been active in society since its early days, particularly in technical activities relating to ship welding.

IN CHARGE of all engineering activities for Sausolito, Calif., yard of Marinship Corp. is BRUCE VERNON (left), assistant to general manager. He drew plans for construction of yard in March, 1942.

DIRECTING DRIVE against accidents in construction industry is G. O. GRIFFIN (right), of Dravo Corp., newly elected general chairman of Construction Section, National Safety Council.

TEAMWORK



gets the job done

This La Plant-Choate "Carrimor" Scraper and "Caterpillar" Diesel Tractor make a tough earth-moving team; for in addition to their individual characteristics of design and construction, both are equipped with Timken Tapered Roller Bearings.

Timken Bearings are teamed up with all kinds of construction equipment for faster, smoother operation; greater endurance; and reduced operating and maintenance costs. These advantages are coincidental with the ability of Timken Bearings to eliminate friction; minimize wear; carry radial, thrust and combined loads; and hold moving parts in correct and constant alignment.

The same advantages that have proved so valuable in overcoming the tough jobs of industry, are enabling Timken Bearings to meet the toughest tasks of war with similar success. The Timken Roller Bearing Company, Canton, Ohio.

Beat post-war competition to the punch with redesigned equipment using a full complement of Timken Bearings.

★

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

LUFKIN

"WESTERN" CHROME CLAD STEEL TAPE FOR HEAVY DUTY

For downright durability and all-around usefulness you can't beat a Lufkin "Western" Chrome Clad Steel Tape. Even in poor light, the jet black markings are easy to read against the satin chrome surface that won't rust, crack, chip or peel. The ¼-inch steel line detaches from frame and is often used like a chain tape. The sturdy frame and smooth winding mechanism add to a "Western's" utility and long life. See it at your dealers and write for our free catalog 12-C.

LUFKIN

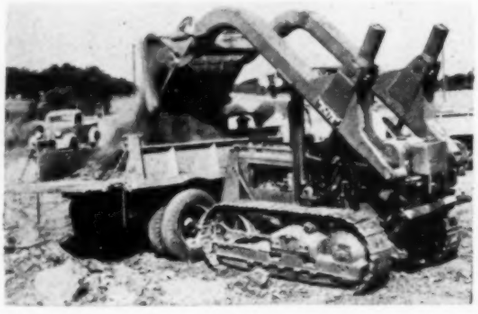
SAGINAW, MICHIGAN • New York City

TAPES · RULES · PRECISION TOOLS

CONSTRUCTION EQUIPMENT NEWS

JANUARY, 1944 REVIEW of Construction Machinery and Materials

DOZERSHOVEL is two-in-one dirt-moving unit. Unique design provides for full-fledged tractor shovel and bulldozer service, with simple interchangeability of bucket and blade permitting in-the-field changeovers in few minutes. As shovel, unit's hydraulic control provides down pressure up to 4,200 lb. Strong side arms permit shovel to lift big loads and dozer to handle any dirt-dozing job. Dumping trip-mechanism gives dozer ability to tip blade forward to release load on uphill dozing. Has unobstructed visibility, low overhead clearance, oscillating tracks, and quick, high lift. Standard hook on upper edge of shovel bucket or dozer blade gives lifting crane service. Changeover requires only simple operations.—**Bucyrus-Erie Co., South Milwaukee, Wis.**



★ ★ ★

REPLACEMENT LINKS for dragline bucket chain enable quick repairs on job and insure tightly held joint. For larger chain, with from 1¼ to 2½-in. section, having longer pitch lengths, "Clark" link (M-91) is recommended. Halves, with interlocking

lugs, are secured by four rivets to produce tight joint. For smaller chain from ⅞ to 1⅛ in., "J-C" link (R-890) is more adaptable. In it, tapered ends fit closely into grooves in opposing half link, and two halves are joined together by single rivet through joined center lugs. Center bar or stud prevents kinking that might lead to destructive jerks in operating.—**American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill.**

Keep ahead of Schedule with GATKE High-Heat-Resisting Asbestos BRAKE MATERIALS

GATKE Brake Blocks and Frictions

Disc Type Clutch Facings

Cone Type Clutch Facings

How do GATKE Brake Materials speed operations and save money? They keep operating and avoid delays. They pick up and release with smooth, positive, non-grabbing action for faster operation—require fewer adjustments.

GATKE Brake Materials are engineered and service proved for every brake and clutch of Excavating, Road Building and Construction Equipment. Just tell us what you need!

GATKE MAKES
Brake Lining
Clutch Facings
Frictions
Non-Metallic Bearings
Sheet Packing

GATKE CORPORATION

228 N. LaSalle St. Chicago

LET'S HAVE A JOB FOR HIM

WHEN HE COMES HOME

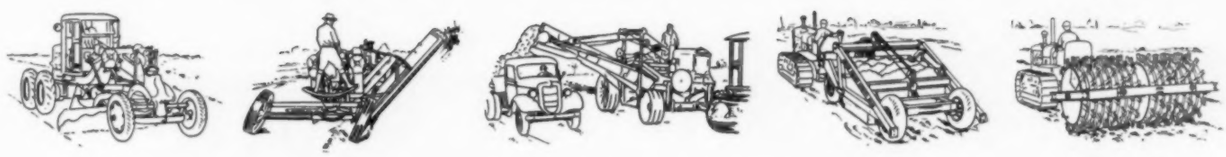
—through Post-War Planning *NOW!*

● While the war is far from being won—yet—the day is coming when millions of uniformed boys will be returning and they will need jobs. The thousands of highway and street improvement projects held up for two years and so badly needed can provide those jobs immediately at the close of the war *if* every state, county, and city administration will bring these projects up to the specification and blue print stage *now*.

Whether you are highway official or contractor, your post-war planning will not be complete without consideration of the many ways in which Adams equipment can be adapted profitably to your work. Your local Adams distributor will be glad to talk this over with you at any time.

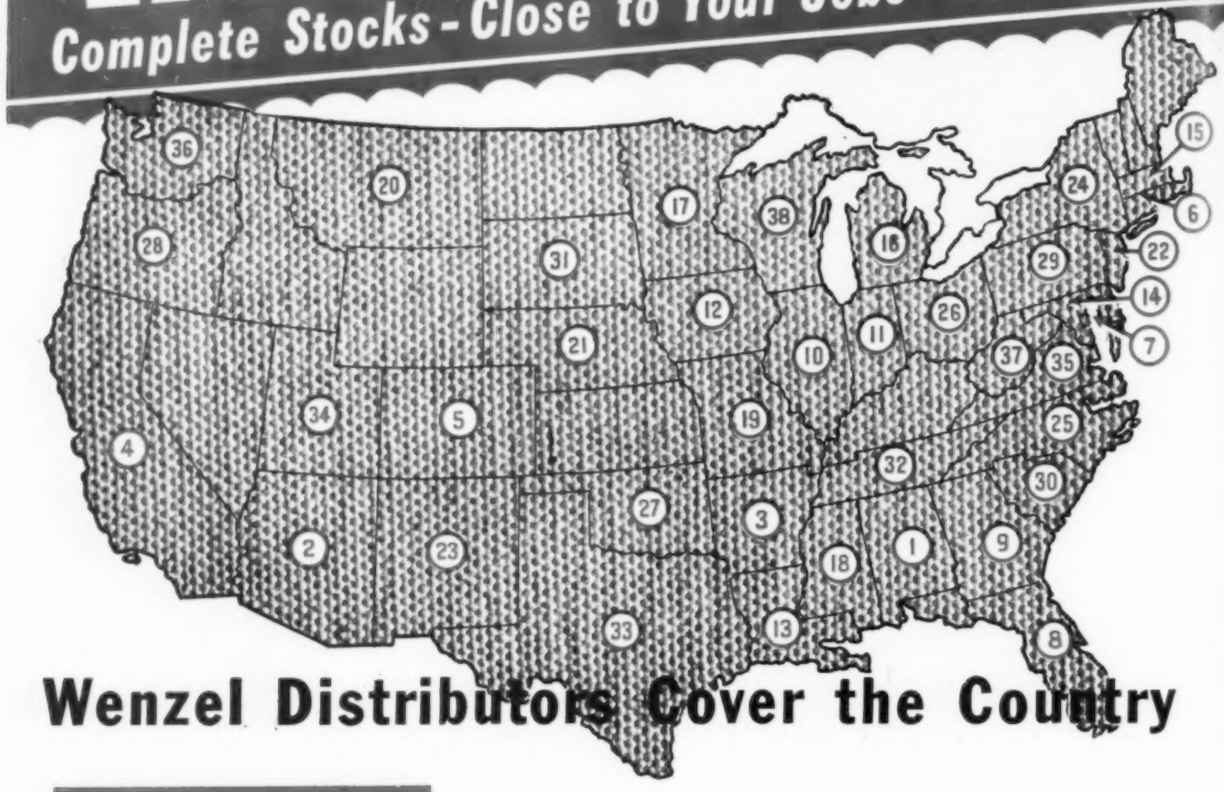
J. D. ADAMS COMPANY, INDIANAPOLIS, IND.
Sales and Service Throughout the World

ADAMS ROAD-BUILDING AND EARTH-MOVING EQUIPMENT



TARPAULINS

Complete Stocks - Close to Your Jobs - No Priority



Wenzel Distributors Cover the Country

Why Para Outsells Any Other Brand in America

PARA Tarpaulins have strictly a paraffin base which contains no oil or clay. They have been air dried—not exposed to excessive heat. The result is that PARA Tarpaulins are dependably waterproof, have extra strength and long life, are not subject to spontaneous combustion. For paramount quality always specify "PARA"—America's most popular tarpaulin.

WHEN you need tarpaulins—and need 'em *fast*—'phone the nearest Wenzel Distributor. His stocks of the nationally famous PARA Tarpaulins are complete—all popular sizes and weights. You can depend upon superior service, immediate shipment, and a product that users agree is "Tops in Tarps." No priorities necessary.

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

H. WENZEL TENT & DUCK C

ST. LOUIS, MO.

File This List of Conveniently Located PARA Tarpaulin Distributors

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

TARPAULIN DISTRIBUTORS

1—ALABAMA
Moore-Handley Hardware Co., Birmingham
Owen-Richards Co., Birmingham

2—ARIZONA
O. S. Stapley Co., Phoenix

3—ARKANSAS
Speer Hardware Co., Fort Smith
R. A. Young & Son, Fort Smith

4—CALIFORNIA
Industrial Equipment Co., Los Angeles
Industrial Equipment Co., Oakland

5—COLORADO
Durango Mercantile Co., Durango

6—CONNECTICUT
Gesner Equipment Corp., Hamden

7—DISTRICT OF COLUMBIA
Hudson Supply & Equipment Co., Washington, D. C.

8—FLORIDA
I. W. Phillips & Co., Tampa

9—GEORGIA
Beck & Gregg Hardware Co., Atlanta

10—ILLINOIS
Becker Equipment & Supply Co., Chicago
Clark & Barlow Hardware Co., Chicago

11—INDIANA
Standard Equipment & Supply Co. Hammond
Van Camp Hardware & Iron Co., Indianapolis

12—IOWA
Harry Alter & Sons, Davenport
Pecaut Industrial Supply Co., Sioux City

13—LOUISIANA
C. T. Patterson Co., Inc., New Orleans
Pelican Well Tool & Supply Co., Shreveport

14—MARYLAND
General Supply & Equipment Co., Baltimore

15—MASSACHUSETTS
Hedge & Mattheis Co., Boston
Parker-Danner Co., Boston

16—MICHIGAN
Eddy & Cuthbert, Lansing
C. L. Gransden & Co., Detroit
Krueger Machinery Co., Saginaw

17—MINNESOTA
Thorman W. Rosholt Co., Minneapolis

18—MISSISSIPPI
Contractors Material Co., Jackson

19—MISSOURI
Brown-Strauss Corp., Kansas City
The Victor L. Phillips Co., Kansas City

20—MONTANA
Billings Hardware Co., Billings
A. M. Holter Hardware Co., Helena
Marshall-Wells Co., Billings

21—NEBRASKA
Anderson Equipment Co., Omaha

22—NEW JERSEY
Dale & Rankin, Inc., Newark

23—NEW MEXICO
Charles Ilfeld Co., Albuquerque

24—NEW YORK
Keystone Builders Supply Co., Rochester
New & Used Equipment Co., Long Island
Rupp Equipment Co., Buffalo
Syracuse Lumber Co., Syracuse
Trevor Corp., Buffalo
J. H. Welch Co., Inc., Buffalo
R. B. Wing & Son Corp., Albany

25—NORTH CAROLINA
Constructors Supply Co., Inc., Durham
Contractors Service Co., Charlotte

26—OHIO
Moriarty Machinery Co., Toledo
The W. T. Walsh Equipment Co., Cleveland

27—OKLAHOMA
Leland Equipment Co., Tulsa
Mideke Supply Co., Oklahoma City
The Victor L. Phillips Co., Oklahoma City

28—OREGON
May Hardware Co., Portland
Woodbury & Co., Portland

29—PENNSYLVANIA
Austin Supply Co., Philadelphia
Dravo-Doyle Co., Pittsburgh

30—SOUTH CAROLINA
C. D. Franke & Co., Inc., Charleston

31—SOUTH DAKOTA
The Dakota Iron Store, Sioux Falls

32—TENNESSEE
Keith-Simmons Co., Inc., Nashville
C. M. McClung & Co., Inc., Knoxville
Orgill Brothers & Co., Memphis
Stratton-Warren Hardware Co., Memphis

33—TEXAS
Amarillo Hardware Co., Amarillo
Peden Iron & Steel Co., Houston
W. H. Richardson Hardware Co., Austin
Sabine Supply Co., Orange
The Walter Tips Co., Austin
Zork Hardware Co., El Paso

34—UTAH
Geo. A. Lowe Co., Ogden
Strevell-Paterson Hardware Co., Salt Lake City

35—VIRGINIA
B. T. Crump Co., Inc., Richmond
Noland Co., Inc., Newport News

36—WASHINGTON
Hardware Distributing Co., Seattle

37—WEST VIRGINIA
West Virginia Tractor Equipment Co., Charleston

38—WISCONSIN
Hunter Tractor & Machinery Co., Milwaukee

14

K COMPANY

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

REGULAR PATTERN SHIMBLES are hot forged from mild steel bars to provide rigid support for wire rope in correct, non-collapsible contour, which is said to be the most efficient rope fitting for direct pull applications and to give improved rope protection. Small area of rope-to-shimble contact insures quick drainage and drying, which largely eliminates corrosive action by salty moisture. This

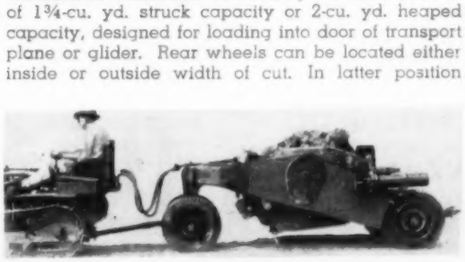
is said to be of special value in marine and coastwise applications. Two styles—regular pattern "standard" and regular pattern "style A," which provides for safe strength of rope as widely used for airplane slings and general applications—are available in full range of rope sizes from ⅛ to 1⅝ in. All shimbles are either painted or galvanized. —**Garlinghouse Bros., 2416 E. 16th St., Los Angeles 21, Calif.**

★ ★ ★

LENSES FOR FLAME WELDERS are now available in four shades: 3, 4, 5, and 6. New and lighter No. 3 shade is particularly useful for welders working on aluminum. Lenses made from Noviweld-Didymium glass absorb sodium flare, thus enabling flame welders to see working areas more clearly and also protect eyes against both ultra-violet and infra-red radiation. Ground and polished to ophthalmic standards, lenses preserve orange and red color values so welders can see red hot bead and molten metal in brilliant colors.—**American Optical Co., Southbridge, Mass.**

★ ★ ★

AIRBORNE SCRAPER is small pocket-size edition of 1¾-cu. yd. struck capacity or 2-cu. yd. heaped capacity, designed for loading into door of transport plane or glider. Rear wheels can be located either inside or outside width of cut. In latter position



great stability is provided for side sloping. Efficient design enables scraper to make full 90-deg. turn or less within circle diameter of 20 ft. without overturning. Designed for use by Aviation Engineers, it will after war provide effective tool for

Success on the fighting front depends to a great degree on how well truck transport performs on the home front. Trucks must not break down at a time when they are so urgently needed to haul the food and materials that will help win the war. The P.M. Service that GMC dealers pioneered long before the war is just the service that will help keep your trucks rolling during these critical times. The start of the New Year is the right time to start taking time out for regular visits to your GMC dealer . . . to take advantage of his proved time-saving, money-saving, truck-saving service!

Special "Service Payment Plan" available through our own YMAC

INVEST IN VICTORY

BUY MORE WAR BONDS

Pledged U.S. TRUCK CONSERVATION CORPS

GMC VICTORY MAINTENANCE KEEPS YOUR TRUCK ON THE JOB

THE TRUCK OF VALUE

GMC TRUCKS

GASOLINE • DIESEL

landscape work, construction of ponds for water conservation, maintenance work on railroads, digging basements, stripping soil, cleaning and constructing ditches on country roads, and similar jobs. Bowl and apron are hydraulically operated by newly designed hydraulic system, with pump located on and driven by tractor, while two double acting jacks control movement of scraper bowl and apron. Three-position valve raises, lowers, and holds cutting edge in position and exerts down pressure. Sufficient clearance under bowl is provided. Spreading of load is accurately controlled from 7 to 12 in. Shipping weight is only 2,520 lb. Overall width is 64 in. and length is 147 in.—**LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa.**

★ ★ ★

SYNTHETIC RUBBER PRODUCT, called industrial So-Lo, will repair breaks, burnt or worn spots, fill holes or resurface industrial belts of all types. Maker claims it will greatly lengthen life of belts and permit continued use of some conveyor belts that might otherwise be discarded. Is easily applied, dries tough overnight, and one quart covers about 14 sq. ft. Consists of cement primer and mastic. Belt surface is roughened and primer applied. Mastic is then spread on. Is also used to resurface metal, wood and composition pulleys. Safeguards workers when used as insulator to cover switch handles and other electrical devices and prevents slipping when applied to metal and concrete stair treads.—**So-Lo Works, Inc., Loveland, Ohio.**

National

Carbide

FLOODLIGHTS

VALUABLE IN PEACETIME

A NECESSITY NOW!

FOR ALL PURPOSES WHERE FLOODLIGHTS ARE REQUIRED.

Simple in Construction
Economical in Cost
Dependable in Operation

Available in 1500, 8,000 and 16,000 candlepower units.

Write today for literature showing entire lines of Floodlights and Lanterns.

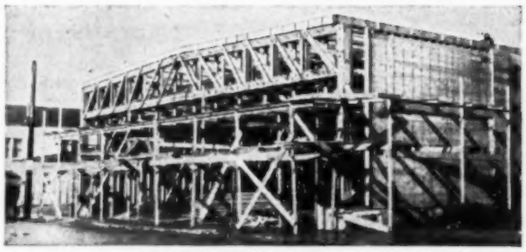
NATIONAL CARBIDE CORP.
60 East 42nd Street
New York 17, N. Y.

NC 200

MANUFACTURING PLANTS utilize ring-connected Bowstring roof trusses to achieve economy and large areas of clear floor space. For this 210'x280' building, Timber Structures prefabricated and erected 26 - 105' trusses.

ECONOMY IS IMPORTANT-

...BUILD WITH TIMBER STRUCTURES



RETAIL BUILDINGS such as this one for Safeway Stores, are economical to build, rapidly erected, long lived. For this 57'x 100' building, trusses were designed for 10 lb. dead load; 40 lb. live load; 10 lb. ceiling load; and erected on the forms before concrete side walls had been poured. Architect: Barrett & Logan. Contractor: Knott, Rogers & Dunbar.

WAREHOUSES call for utility plus economy. This structure for International Harvester Co. is 188'x266'; called for 32-62' roof trusses. Engineer: Sam Murray. Contractor: General Construction Company.

OUR organization has been working with contractors, engineers, architects since the thrifty 30's. The business rule then is a good business rule now—*build well and economically.*

Wood, properly designed, fabricated, assembled and erected has achieved both of these objectives. Our experience has proved time and again that timber trusses and heavy framing provide a logical answer to reasonable building costs for structures of varied types and sizes in many major industries.

In addition to economy, products of Timber Structures have the advantages of strength, permanence, ready source of supply. Whether your construction plans are immediate or post-war, our experience is at your disposal. Inquiries are welcomed on the use of wood or other structural materials. Booklet on typical Timber Structures jobs is yours for asking.

Use of Teco timber connectors utilizes full structural strength of lumber by spreading the load on joints over entire cross-sections of the wood.

TIMBER
WARD MAYER
STRUCTURES
INCORPORATED
Portland 8, Oregon — New York 17, N.Y.

Engineering in Wood

MAIL COUPON FOR LITERATURE

TIMBER STRUCTURES, Inc.
Send Book "Engineering in Wood"

Name_____

Address_____

Type of building or business . .

If *west* of the Mississippi, send to Portland 8, Oregon. If *east* of the Mississippi, send to 535 Fifth Avenue, New York 17, N. Y.

For SPEED and SAFETY . . .

LOWELL
Reversible Ratchet
WRENCHES

You gain speed through the easy handling, strong leverage and straight-line application of power on LOWELL REVERSIBLE RATCHET WRENCHES.

The improved new types of LOWELL WRENCHES are the result of more than 70 years experience and development—1869 to 1942. They are made in a wide range of types and sizes for all classes of heavy construction, erection and maintenance.

Have patience with your dealer if he is unable to furnish all of the numerous LOWELL types and sizes, for we are engaged, for the duration, in supplying the needs of our Armed Forces.

See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear, in a straight line and with a "square" contact. The pawl is in COMPRESSION ONLY—no shear, no tension, no torsion. The shipper carries NONE of the load. This strong construction insures steady service.

LOWELL WRENCH CO.

1869 WORCESTER, MASS., U.S.A. 1943

SPRAY GUN. Model 17, is made with die-cast zinc to replace models made with scarce materials. Of one-piece sturdy construction, with lusterless war finish, it has all controls at back. Width of

spray is adjustable from round to flat with all widths in between. Can be furnished with nozzle combinations for use with syphon feed cup, gravity bucket and pressure material container for applying any material to surface.—**Binks Mfg. Co., 3114 Carroll Ave., Chicago 12, Ill.**

So Inexpensive You Can Use Them Freely!

Simplex Screw Jacks, 19 sizes with 4-hole head; 9 sizes with ratchet head. 8¾" to 23" high; 4" to 14¼" lift; 5 to 30-tons capacity.

The contractor on a roof raising job ordered 204 Simplex Screw Jacks which more than paid for themselves on this job alone. At a low cost, these screw jacks provide such features as a single large chrome-moly ball bearing under the forged steel cap which reduces friction 88%, and a non-breakable malleable iron base with safety peephole to prevent over-extension of screw.

Templeton, Kenly & Co., Chicago (44), Ill.
Better, Safer Construction Jacks Since 1899

Save On Every Construction Job!

There are scores of Simplex Jacks to lick tough lifting, tensioning, pulling, shoring and leveling jobs. Send for Catalog 44.

Simplex
LEVER - SCREW - HYDRAULIC
Jacks

For a "GOOD BUY" in SHOVELS

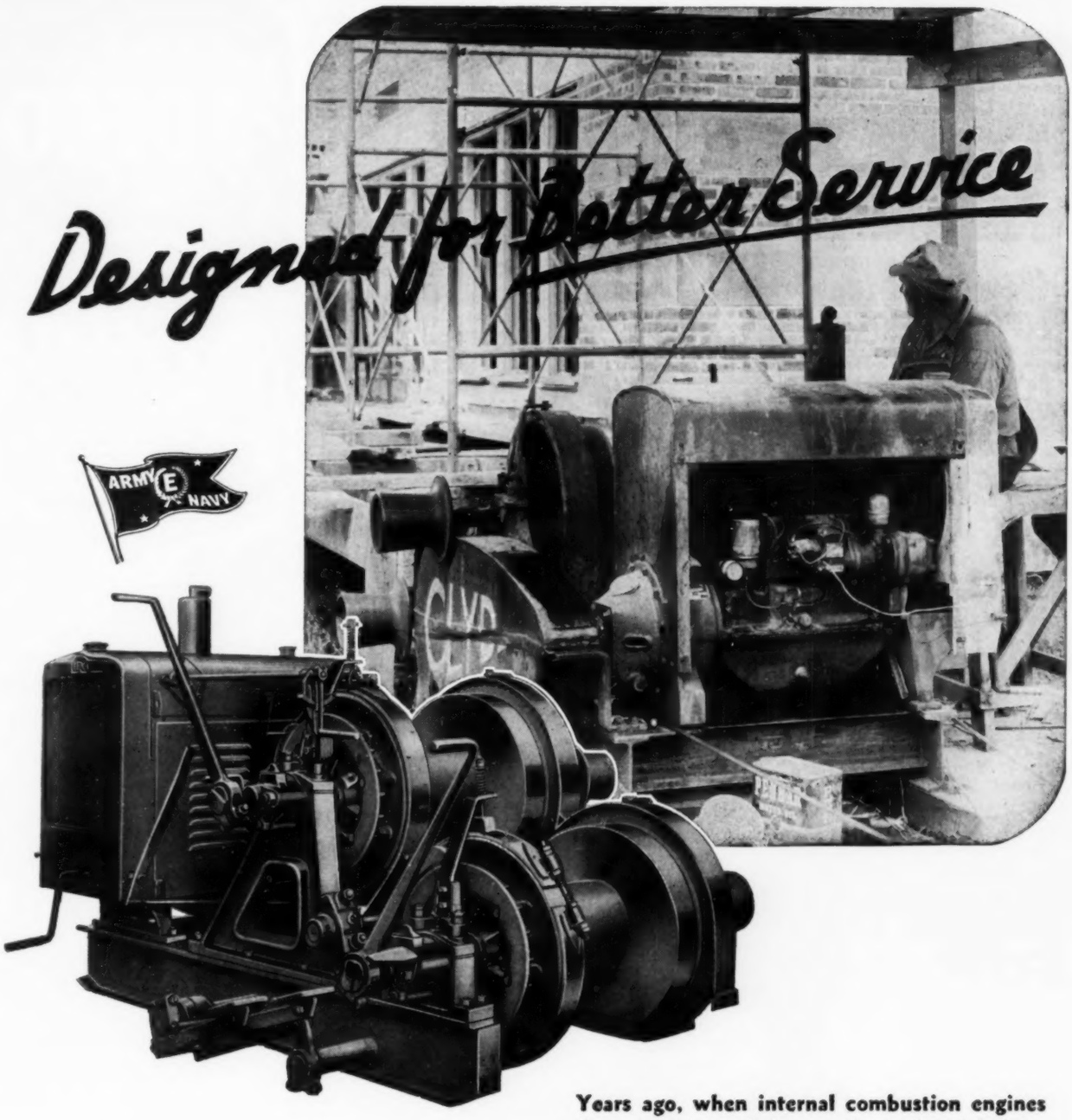
Ask for The ONLY SHOVELS *with* BLADE EDGES

GUARANTEED SPLIT-PROOF

INGERSOLL SHOVELS
"The Borg-Warner Line"

Write for Catalog and Prices
INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
New Castle, Indiana
Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.

Designed for Better Service



Years ago, when internal combustion engines first came into their own for industrial duty, Clyde proved that better hoisting equipment meant lower operating costs and increased construction schedules.

Write for Bulletin K-4 for complete information on Clyde Gasoline Hoists.

Now, when the pressure of the present emergency is putting more demands upon equipment than ever before, it is the hoist that was designed for better performance that's standing the strain.

When Victory is finally won; you will again want the advantages of Clyde hoists to help solve your construction problems. We'll be glad to give you information on your future Clyde hoist now . . . there's a wide range of sizes and types . . . a hoist for every job.

CLYDE

CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

1/4 to 1/3

Less Steam

TO DRIVE PILES

SUPER-VULCAN

OPEN TYPE

Differential Acting

PILE HAMMERS

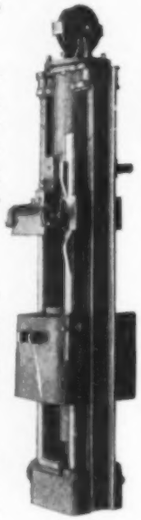
18c-30c-50c and 80c

You save money with a Super-VULCAN on the most extensive projects and also you realize greater speed in driving each pile for the Super-VULCAN gives you twice the blows per minute.

These points are very important ones to consider, especially now for immediate and future construction. Another way you save money is that the Super-VULCAN uses 25 to 35 per cent less steam.

Rugged strength — simple design—positive action — durability — compactness are all points you should know about in greater details.

The open type fits the same leads and uses the same accessories as the VULCAN Single - Acting Pile Hammer.



Sizes
18C—30C
50C—80C

VULCAN IRON WORKS
Since 1832
331 North Bell Avenue
Chicago Illinois

DROP BOTTOM DUMP SKID BOX speeds efficient handling of small parts. Used with Towmotor truck, box is large and strong enough to carry equivalent of several hand-truck loads. Available in several sizes, it is carried at normal level to point of unloading, where it is lifted to top of hoist and back of box is secured by loops to upper cross arm. Lowering forks with back of box in this position dumps load. Entire operation can be performed in few seconds.—**Union Metal Mfg. Co., Canton, Ohio.**

★ ★ ★

NO. 10 BEAM COMPASS features micrometer adjustment at pivot point to set measurement to approximately .001 in. if necessary. Can be supplied for any length bar. Pivot pin is phonograph needle retained by nut with hole having same

taper, thus causing pin to project only specified amount. Chuck pencil holds standard lead or can be replaced with steel point for scribing on metal. In addition, clip can be fastened anywhere on bar to hold pen, pencil, or scriber.—**Mark Specialty Co., 406 Temple Bldg., Rochester (4), N. Y.**

ARMSTRONG
CONSTRUCTION TOOLS

ARMSTRONG
DROP FORGED WRENCHES

All ARMSTRONG Construction and Structural Wrenches are drop forged from special analysis tool steel, and heat treated. Openings are accurately machined, handles are long and tapered for ease in lining up bolt holes.

"Construction" Wrenches in Chrome-Vanadium or Carbon Steel—with 15°, 45° or 90° angle heads with openings of from 7/16" to 2".

"Structural" Wrenches with straight heads and off-set handles, in Chrome-Vanadium or Carbon Steel in the sizes listed above.

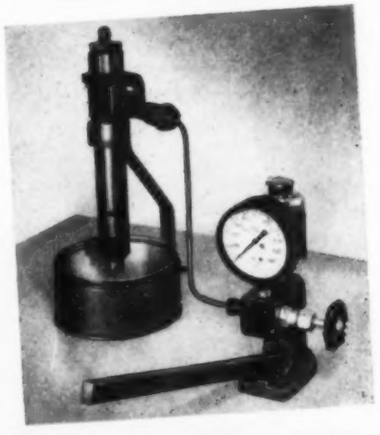
"Box Socket Structural Wrenches, in Chrome-Vanadium only, with double hexagonal (12 point) openings from 1 1/16" to 2 3/16". (Recommended wherever an open end wrench is not required because of these safety convenience features.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
334 N. FRANCISCO AVE. CHICAGO, U.S.A.
Eastern Warehouse & Sales: 199 Lafayette St., New York

ADECO

NOZZLE TESTER
FOR DIESEL ENGINES



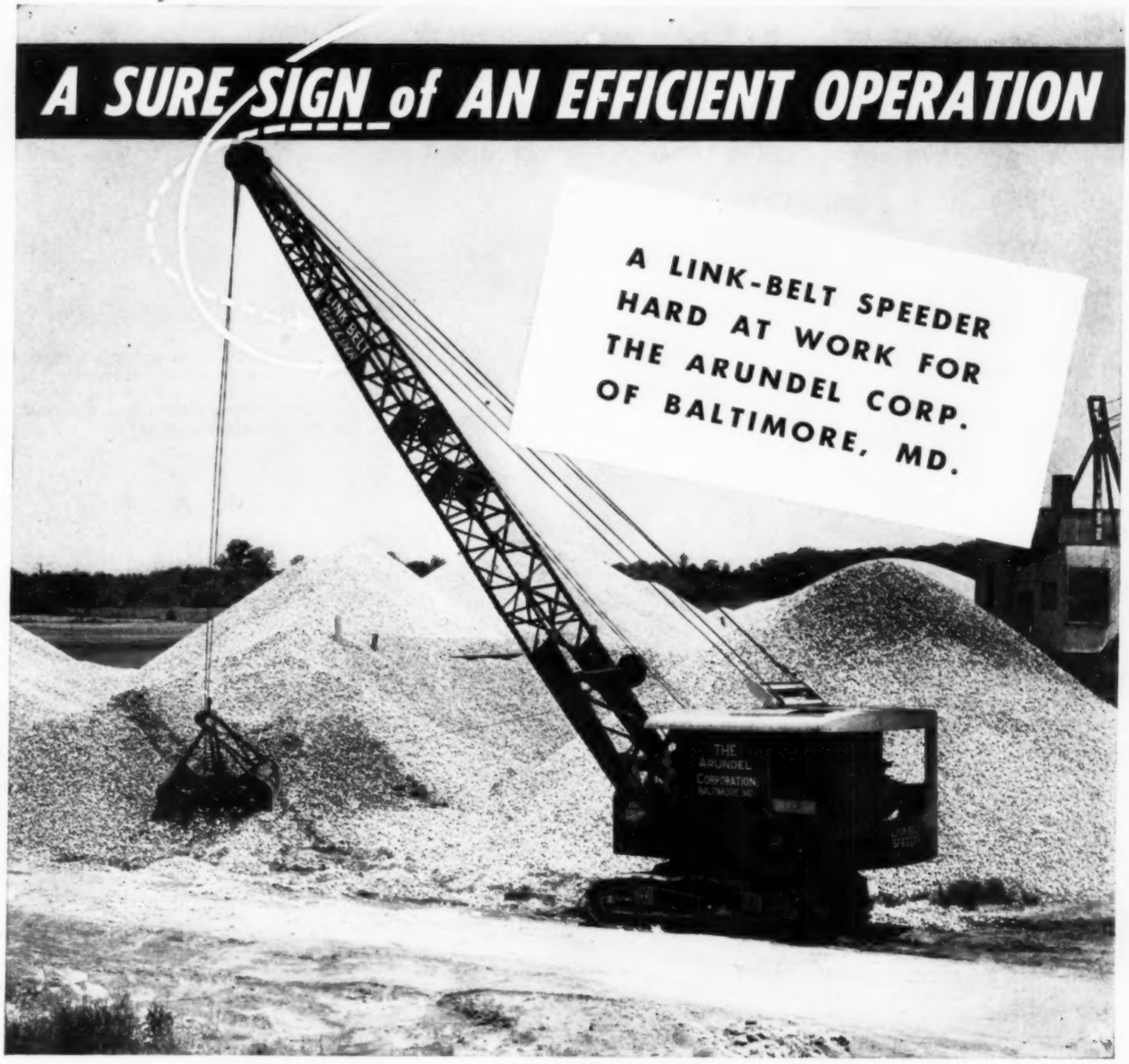
HOW TO KEEP DIESEL ENGINES RUNNING AT PEAK EFFICIENCY

With this sturdy, portable, lightweight Adeco Nozzle Tester, any mechanic can easily make quick, accurate tests on injector opening pressure, spray pattern, etc.; and detect stuck needle valves and leakage around valve seats. Adeco advantages have made this America's most widely used nozzle tester. Tests both large and small injectors, on bench or engine. Avoids costly delays and possible damage to engine. Keeps diesels operating at peak efficiency.

• **Write for new illustrated bulletin.**

AIRCRAFT & DIESEL EQUIPMENT CORP.
4401 N. RAVENSWOOD AVE.
CHICAGO, ILLINOIS

A SURE SIGN of AN EFFICIENT OPERATION



★ BUY MORE BONDS THAN EVER BEFORE ★

When you see a Link-Belt Speeder shovel, dragline or crane on the job you are watching the kind of efficient, trouble-free operation that contractors all over the country are looking for in order to do a better job in less time. There are 25 different models of Link-Belt Speeder shovels, draglines and cranes—a type and size to fit every job. 9398

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

"No lips but yours shall ever touch mine"

Industry has gone for Dixie Cups in a big way, because of the protection they bring to workers' health. Used but once and thrown away, they never pass along colds or other illnesses.

This was never more important than in the present crisis, when sick absenteeism must be combated all along the line.

For water service on the job, either outdoors or under cover, Dixie Cups are a proven asset in keeping job progress on schedule.

Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S.C. and Toronto, Canada.

We suggest you keep on asking for Dixie Cups even though they are hard to get. We're doing our best to catch up. The war needs come first; then our old and regular customers. So keep on asking — maybe next time your Dixies will be available.

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

ROAD CLEANING MAGNET is useful on highways and airports. When mounted on truck three magnets can cover road span of 8 to 9 ft. drawing any metal in its path. Operates best when sus-

pended to within 2 to 3 in. above ground, thereby drawing subsurface material from loose ground. Ordinary farm generator plant is sufficient to supply necessary power.—**Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.**

★ ★ ★

MASTIC BOARD STRIP has been developed for highway dummy joints. Is ⅛ in. thick, has high degree of rigidity and meets all federal and state specifications. Is furnished in full-size sheets, 36 in. wide and up to 10 ft. long, scored to required widths, which are generally 2, 2¼ or 2½ in. Is homogeneous product and completely waterproof.—**Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.**

★ ★ ★

GRAIN DIRECTION in wood can be determined by new "slope of grain detector," simple, hand-operated instrument which locates and traces grain and thus permits accurate measurement of its deviation from straight line running parallel to sides

★ R. B. Tyler Co., Inc., Louisville, Kentucky, has the contract to clear, grub, grade, limerock base and pave the runways on this important airport project at Kinston, North Carolina. Every employee on this job is putting 10% or more of his pay into war bonds.

"GULF QUALITY PRODUCTS AND FINE SERVICE

are helping us beat the schedule on this rush job"

. . . says Superintendent John Crockett

"We're getting top performance from every piece of equipment . . . and our maintenance costs are very low"

"Our fine operating record on this rush airport job is further proof to us that Gulf quality lubricants and fuels insure efficient and economical equipment performance," says Superintendent John Crockett of R. B. Tyler Co., Inc.* "And thanks to Gulf's excellent service, we always have a good supply of their products on hand to meet our requirements."

There's a double squeeze today on America's construction men—every job is marked rush, and new equipment and spare parts are hard to get. So these are the orders of the day on every construction project: *make equipment operate more efficiently, last longer!*

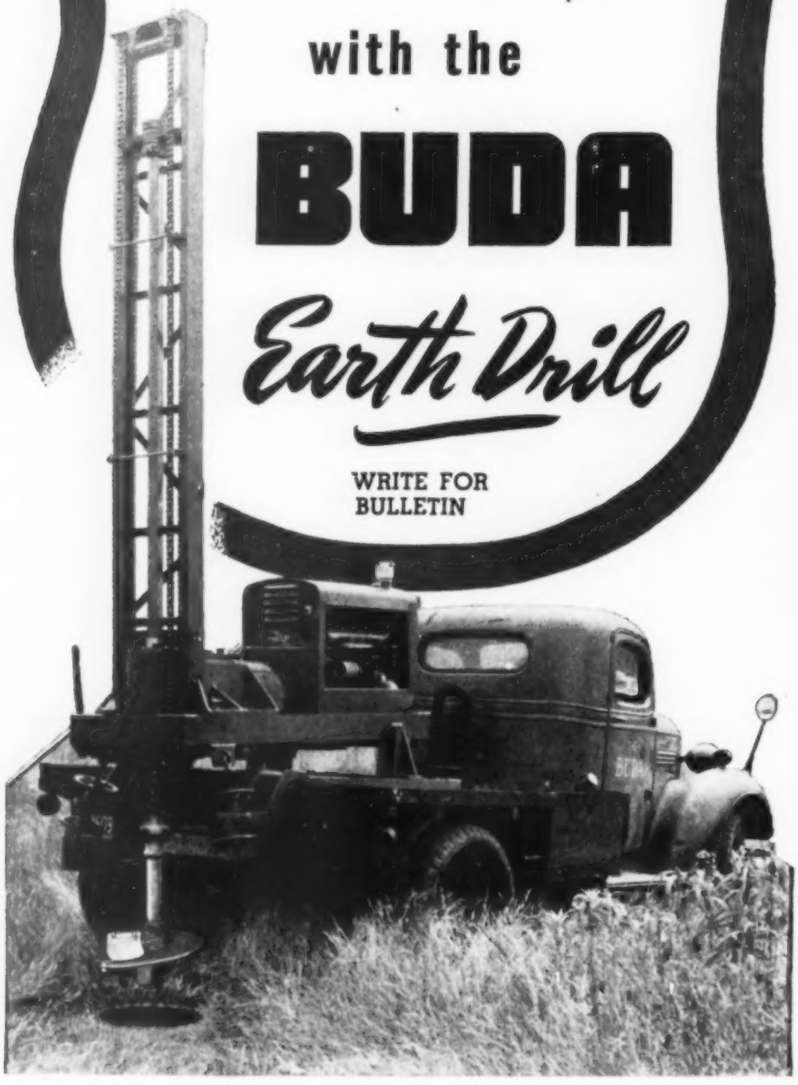
Here's how to get effective help in carrying out these orders on *your* jobs: Call in a Gulf Service Engineer and ask him to prescribe the proper type and grade of lubricants and fuels for each piece of equipment you are using. From Gulf's complete line, he will select lubricants that provide maximum protection to your equipment under every operating condition. And, he will recommend fuels that insure top-notch equipment performance. Write or phone your nearest Gulf office today.

GULF

GULF OIL CORPORATION
GULF REFINING COMPANY
GULF BUILDING, PITTSBURGH, PA.

Clean, Straight Holes
for
FOUNDATIONS
in a hurry
with the
BUDA
Earth Drill

WRITE FOR
BULLETIN



the BUDA company
HARVEY (Chicago Suburb) ILLINOIS

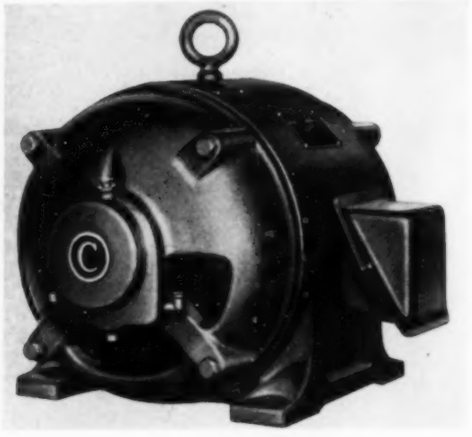
of member under test. Angle of deviation determines slope of grain rating of piece on which load values may be based. Tracing needle follows grain at any point on surface of wood. With it direction groove of necessary length can be scribed to establish angle of deviation.—**Timber Engineering Co., Washington, D. C.**

★ ★ ★

WELDING POSITIONERS facilitate accurate downhand welding, reducing both cost and operating time. No overhead cranes are tied up during welding process. Designed to meet requirements of the particular job, they come in sizes ranging from small hand-operated units to machines with capacities of over 20 tons.—**Quickwork Division, Whiting Corp., Harvey, Ill.**

★ ★ ★

PROTECTED MOTOR, Form J., general purpose, open rated, is available in sizes from 1½ to 15 hp. Upper half of end bracket is closed to minimize possibility of dripping liquids or falling solids entering vital parts of motor. Powerful fans located



behind bearing brackets draw cooling air through bearing bracket openings, around bearings, across windings, and to air passages between outer surfaces of magnetic core and frame, with heated air expelled through openings at side and bottom of frame.—**Century Electric Co., 1806 Pine St., St. Louis 3, Mo.**

★ ★ ★

JOURNAL BOX AND BEARING is designed for ease of accessiblity and maintenance. Back of box at axle fit is equipped with steel labyrinth which effectively excludes extraneous matter and retains lubricant within box. Anti-friction bearing is of double row roller type amply designed for size of locomotive to which applied. Box cover is of screw type which makes bearing adjustments simple. Bearing is lubricated by means of grease fitting in cover, which is recessed so outer edges protect fitting. Box is equipped with renewable wearing plates.—**Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.**

They Like STERLING

PUMPS · HOISTS · LIGHT PLANTS

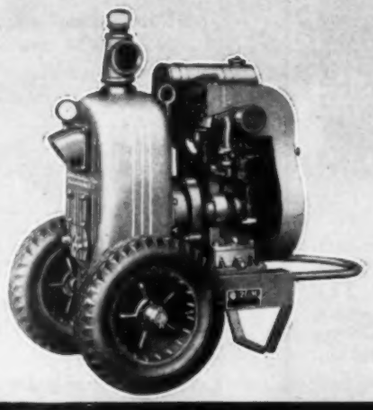
In Mexico Too!

BOMBAS STERLING . . . down Mexico Way, that's how they say, Sterling Pumps. Mexico is just one more place where Sterling Pumps, Hoists and Light Plants have made friends because of their SIMPLE design, DEPENDABLE performance and RUGGED construction.

Mr. A. Rudich, General Manager of The General Supply Company, S. A. of Mexico City writes . . . "Mexican users demand Sterling Self Priming Centrifugal Pumps due to their high efficiency and perfect streamlined construction. Our customers are convinced that Sterling MEANS QUALITY."

Regardless of where you may be, there's a Sterling Distributor ready to serve you. Sterling Distributors maintain complete staffs of service engineers and field men who will be glad to help you. Write today for the name of your nearest Sterling Distributor, complete literature and information on Sterling Pumps, Hoists and Light Plants.

ALLIED MEMBER A. E. D. • MEMBER CONTRACTORS PUMP BUREAU A. G. C.



Sterling
MACHINERY CORPORATION
405-13 SOUTHWEST BLVD.
KANSAS CITY 10, MISSOURI

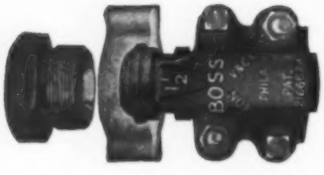
PROOF . . . *Against Leaks . . . Pressure Losses . . . Blow-offs*

"G J-BOSS"

GROUND JOINT

FEMALE HOSE COUPLING

STYLE X-34



Many years of reliable performance have proved the efficiency, safety and economy of "G J-BOSS" Couplings on high and low pressure steam, air and liquid hose. Grouna Joint construction provides permanently leakproof, soft-to-hard metal seal when wing nut is tightened. "BOSS" Offset Interlocking Clamp anchors coupling to hose with a powerful, full-circumference grip, without pinching. Corrugated stem assures added holding strength.

Made in sizes ½" to 4", inclusive, and furnished with male or female spuds.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods.

NOW . . . More Than Ever . . . BUY BONDS

DIXON
VALVE & COUPLING CO.
Main Office and Factory: PHILADELPHIA, PA.
BRANCHES: CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

PORTABLE GENERATOR is believed to be most powerful of its size ever produced. Net weight is only 305 lb., length, including base, is 34 in., and height 26 in. Delivers 3,000 watts, 110 v. a.c., 60 cycle. Field ring is high-grade annealed cast steel which produces top electric efficiency for given

weight and gives maximum support and stability. Cast iron fittings secure unit to oak sled runners which serve as strong but light base. End bells are of open design like wheel with spokes. Dust covers are of lightweight steel spinnings. Pulleys of Epcon B-30 generator are of cast steel disks.—**Electric Products Consolidated, Seattle, Wash.**

C.H.&E.

Since 1908 C. H. & E. equipment has been serving the Construction Industry.

Representatives with C. H. & E. stock, in all parts of the country.

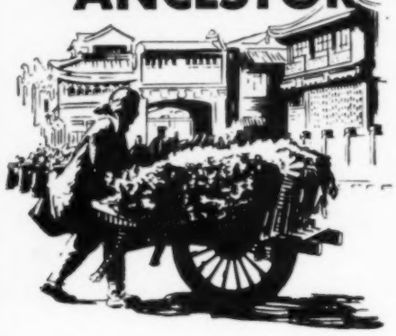
Self-Priming Centrifugal

No. 31 Saw Rig

Write for complete catalog covering Saw Rigs, Pumps, Hoists, Mortar Mixers, Bar Benders, Bar Cutters, and Three-Ton Road Rollers.

C. H. & E. Manufacturing Co.
3847 No. Palmer St.
Milwaukee 12, Wis.

HATS OFF to this Sterling "ANCESTOR"



Centuries ago, the Chinese were the first to apply the principle of the wheel to the wheelbarrow and it soon became the most widely used freight conveyance in China for hauls up to 10 miles. The load was placed *above* the wheel. Only a little weight was thrown on the user's arms.

Today, Sterling Wheelbarrows continue to apply that same labor-saving principle. Sterling sturdy, balanced construction puts 80% of the load on the wheel, thus easing the task of the operator and making it possible for him to haul *more loads per day.*

While only a few Sterlings are available for the Duration, we hope to manufacture more immediately after the war.

STERLING Wheelbarrow Co.
Milwaukee 14, Wisconsin

Sterling S
Look for this Mark of STERLING Quality
WHEELBARROWS

A-4264-1s

Advanced in { DESIGN / CONSTRUCTION / APPEARANCE

Write for
COMPLETE SPECIFICATIONS

Ask for
NEW BULLETIN CM-14

★
★
★

3/8 YARD SHOVEL . . . 6 TON CRANE

Convertible to

CLAMSHELL . . DRAGLINE . . TRENCH HOE

AIR CONTROLLED

MICHIGAN
POWER SHOVEL CO.

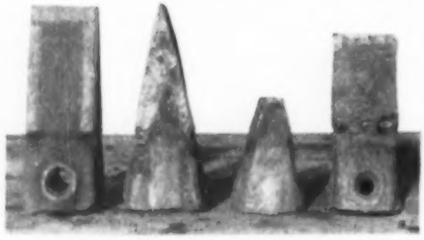
BENTON HARBOR, MICHIGAN

MB
is Marching
"ON-THE-DOUBLE"!
In the present emergency, practically the entire facilities of the M-B plant are devoted to the war effort. We are working day and night, producing vitally needed war materials to help beat the Axis. At the same time, we are preparing for a peaceful, post-war era which we hope is just around the corner. Already our engineers have made constructive plans for the further improvement of M-B civilian equipment — Trailers... Winches... Street and Road Markers... Industrial Markers... Centrifugal Pumps. For literature write: MEILI-BLUMBERG CORP. • New Holstein, Wis., U. S. A.
MEILI-BLUMBERG
Manufacturers of the Famous M-B Line of INDUSTRIAL EQUIPMENT

A 4191-½

Your Worn Dipper Teeth Are Still

"Good as Gold!"



From left to right: (1) Ready for service,—bucket tooth hard-faced along sides and at point after new tip has been welded on worn tooth. Note hard-facing protection around hole. (2) The same tooth, side view. (3) Typical worn tooth. (4) The same after welding on a new tip.

DON'T DISCARD old bucket teeth,—no matter how badly worn. Rebuilding and hard-facing with Coast Metals will make them good as new,—at less than half the cost of new replacements!

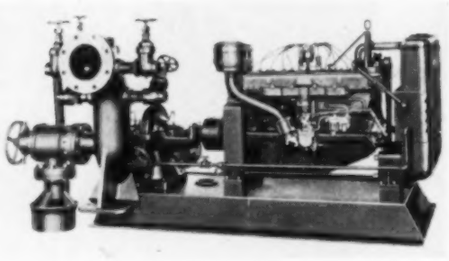
In fact, Coast Metals Hard-Facing makes your power shovel and bucket lips and teeth *better than new*, since they will outlast and outwear ordinary unprotected lips and teeth several times. You can use Coast Metals Hard-Facing also for minimizing wear on tractors, dirt movers, rooters, rippers, crushers and other earth-moving and road building equipment.

Patented Coast Metals Hard-Facing alloys are easily welded to all ferrous metals, including manganese steel, alloy steels, cast iron and chilled iron. Write for new pamphlet, giving full details.

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York 19, N.Y.

COAST METALS *hard-facing weld rods*
MAKE YOUR EQUIPMENT LAST LONGER

ENGINE-DRIVEN FIRE PUMP is designed as standby unit in event of failure of electric power or steam pressure. Available in capacities of 500, 750 and 1,000 gpm. Develops full hp. in minimum of time. May be equipped for automatic operation starting



from pressure switch or thermostat. Conforms to specifications of National Board of Fire Underwriters and National Fire Protection Association, carries approval of Underwriters Laboratories and inspection department of Associated Mutual Fire Insurance Co.—**Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.**

★ ★ ★

MICRO-POSITIONER for pneumatic valve response is used to insure precise and dependable valve response, especially where operating conditions may make response uncertain, slow, or unsatis-

factory. It is actuated by air pressure changes as slight as equivalent of ½-in. of water and can compel valve stem movements as small as 1/1000 of an inch. Flexure type bearings eliminate effects of mechanical vibration, without loss of sensitivity. —**Foxboro Co., Foxboro, Mass.**

A 'DOZER BLADE ACTUALLY PUSHED THIS SCRAPER *Out* OF SERVICE!

THE EXTENT OF YOUR OPERATION TOMORROW MAY DEPEND ON THE CARE YOU GIVE YOUR TIRES TODAY

THE careless handling of a 'dozer blade may result in the *irreplaceable loss* of *machine* and *man hours*, in addition to the loss of precious rubber.

Avoid these tire abuses:

Spinning the drive wheels
Locking a wheel for a short turn
Hitting obstacles in the road
Using damaged rims
Neglecting air pressure

Proper care means longer tire life, fewer time losses and better operation. Ask Firestone for a tire specialist to analyze your equipment and tell you about the FIRESTONE CONSERVATION PLAN.

Listen to the Voice of Firestone with Richard Crooks and the Firestone Symphony Orchestra, under the direction of Howard Barlow, Monday evenings, over N. B. C.

Firestone
OFF-THE-ROAD TIRES

GROUND GRIP TRUCK TIRE

For use on driving wheels of earth-moving trucks, truck tractors, and semi-trailer units in soft going or fill.

ROCK GRIP EXCAVATOR

Cut-resisting tread with double thick sidewalls for greater strength in strip-mining operations.

ALL-NON-SKID EARTH-MOVER

For scrapers and trailer wagons. Low inflation pressures prevent impact breaks and provide maximum flotation and traction.

MORE EARTH MOVER MACHINES ARE EQUIPPED WITH FIRESTONE EARTH MOVER TIRES THAN WITH ANY OTHER MAKE

Clearing AN AIRFIELD OF HEAVY tangled ROOTS WITH THE SEAMAN MIXER

PIONEERED by Seaman

Showing hood-raised operation of the SEAMAN MIXER as used in clearing heavy matted root growth.

The contract for the construction of a military airfield called for complete removal of dense, tangled and matted roots, — many two inches in diameter, — as part of the runway subgrade preparation.

Thousands of dollars would have been spent in slow, tedious work if orthodox methods had been used — but the SEAMAN MIXER again proved its versatility in a new and unusual solution of this problem.

First, heavy disks cut roots into segments. Then two SEAMAN MIXERS went to work. With hoods raised as in aerating operations, the SEAMANS completely dug out the root segments to the required depth and left them on the surface, for removal.

That the SEAMAN MIXER does a more efficient job in pulverization and in-place mixing for soil stabilization is an accepted fact. Astonishing, however, are the new applications that are constantly being developed. Root removal is but one of many.

for many years, SEAMAN engineers have kept in close touch with soil stabilization developments. The results of their experience has been compiled in a pocket-size booklet — "Soil Stabilization Methods". Written by practical men, it is filled with up-to-date and useful information for men in the field. For your copy ask for Bulletin E-22.

MODEL MHD-72

SEAMAN PULVI MIXER

SEAMAN MOTORS
MILWAUKEE
WISCONSIN

GRIFFIN
WELLPOINT CORPORATION

Announces

EXTENDED DISTRIBUTION FACILITIES

THE Griffin Wellpoint Corporation, manufacturers of Griffin Wellpoint Systems for dewatering and water supply, high pressure jetting pumps, portable fire pumps and oil pumping equipment, and their associate, the Griffin Equipment & Supply Corporation, manufacturers of gasoline and diesel engine-driven generator sets, lighting plants, portable floodlighting equipment, and gasoline and diesel engine-driven marine auxiliary sets, have arranged for the distribution of these products through warehouse stocks maintained at the following locations:

● SOUTHERN DISTRICT
Griffin Engineering Corporation
633 North Myrtle Avenue
Jacksonville 4, Florida
Phone. Jacksonville 5-4516

● MIDWEST DISTRICT
Griffin Engineering Corporation
548 Indiana Street
Hammond, Indiana
Phone: Hammond 1662

● With these two additional distribution points we will be able to render even greater service to our customers.

GRIFFIN WELLPOINT CORP.
881 EAST 141st ST. • NEW YORK, N. Y.
Phones: MElrose 5-7704-5-6

FLUORESCENT LUMINAIRE with one-piece, double-length hood and two full-size reflectors is designed for easy continuous strip installation. Available for use with four or six 40-watt or four 100-watt Mazda F lamps, Type F N C luminaire is equivalent

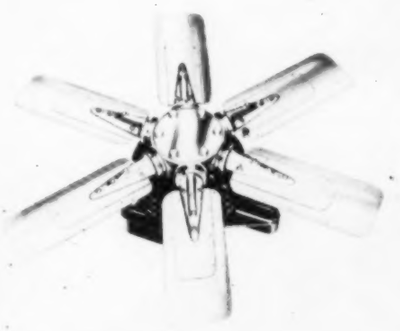
of two conventional units. Hood is fabricated from sheet steel with all ballasts, lamp holders, and starter sockets mounted and wired as part of channel assembly. New sliding hangers permit suspension from any part of hood. Mounting arrangements are available for any application. Moisture-resistant, non-metallic reflectors are covered with multi-coat polymerized finish which provides reflection factor of 85 percent or more. Wing-lock permits easy removal of reflectors for cleaning.—**Westinghouse Electric & Mfg. Co., Lighting Division, Edgewater Park, Cleveland, Ohio.**

★ ★ ★

HYDROCARBON CLEANER is designed for quick removal of oils and solid particle dirts and greases. Running Gear cleaner is said to be ideal for metals in general, road and mining machinery, tractors, tank chassis, gun mounts, large machines, and parts and assemblies, prior to repairs or refinishing. Is combination solvent and alkaline cleaner. —**Technical Processes Division, Colonial Alloys Co., Colonial Philadelphia Bldg., Philadelphia 34, Pa.**

★ ★ ★

TEMPERATURE CONTROL for internal combustion engines is furnished by improved controllable-pitch blade fan kit. Controlling thermal element is direct-connected through fan spindle to blade-turning mechanism, which results in extremely compact assembly. Automatic variable-pitch fan is actuated



by thermostatic element directly controlled by temperature of by-passed engine jacket water. As engine temperature goes up, fan blade pitch increases. Fan blades feather from practically zero to as much as 38-deg. pitch and hold engine temperatures within safe, narrow ranges under all load and climate conditions. May be used for gasoline, natural gas and diesel engines.—**Kontrol Fan, Inc., 4031 Goodrich Ave., Los Angeles 26, Calif.**

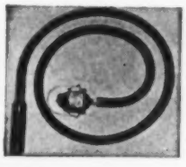
BETTER CONCRETE FASTER
WITH INTERCHANGEABLE VIBER VIBRATORS

9500 R.P.M. IN CONCRETE

The list of contractors who use Viber equipment, and the projects on which it has been used, includes the outstanding names in the construction world! The complete *interchangeability* of Viber equipment, enabling you to add units as desired, or to change them to suit conditions on the job, is another feature that adds to the efficiency of this job-tested equipment, as well as reducing the investment cost.

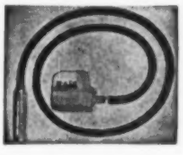
AIR

● FLEXIBLE PNEUMATIC VIBRATOR
Made in 1¾", 2⅛" and 3" diameter with 12 ft. and 21 ft. flexible shaft. Complete interchangeability of flexible casings, cores, vibrators. Operates on 80 lbs. pressure.



ELECTRIC

● FLEXIBLE ELECTRIC VIBRATOR
Made in 1¾", 2⅛" and 3" diameter with 12 ft. and 21 ft. flexible shaft. Complete interchangeability — Flexible Casings, Cores, Vibrators. Universal type motor. Built-in protective "ground."



GAS

NEW FEATURES "GAS" VIBRATOR
Mercury clutch, entirely automatic, picks up load at 1500 r.p.m. allowing engine to idle without running vibrator, eliminates stalling, makes starting easy in cold weather.
Upsetting is practically eliminated in mounting. Handles allow complete unit to be easily carried.

NEW CATALOG
Illustrates and describes the latest Viber equipment—gives complete data on casings, cores, speeds, power, weight, etc. Also new features. Also list of users and jobs where used. Write for your copy today.

VIBER COMPANY
726 South Flower St.
BURBANK, CALIFORNIA

THESE
SAFETY "FIST-GRIP" CLIPS
SAVE METALS • SAVE TIME
PREVENT ACCIDENTS

Save Metals—25% fewer clips do the job better.
Save Time—fewer clips to put on—nuts tighten faster, with any type wrench.
Prevent Accidents—can't be put on backwards.

THESE "FINGER-PINCH" CLIPS WASTE METALS

More clips required. Pinch and distort rope. Protruding bolts easily damaged.

WASTE TIME

Must be applied with saddles on load end of rope. Can't be tightened unless proper wrench is handy.

SAVE MEN, MATERIALS, AND TIME WITH

LAUGHLIN "FIST-GRIP" CLIPS

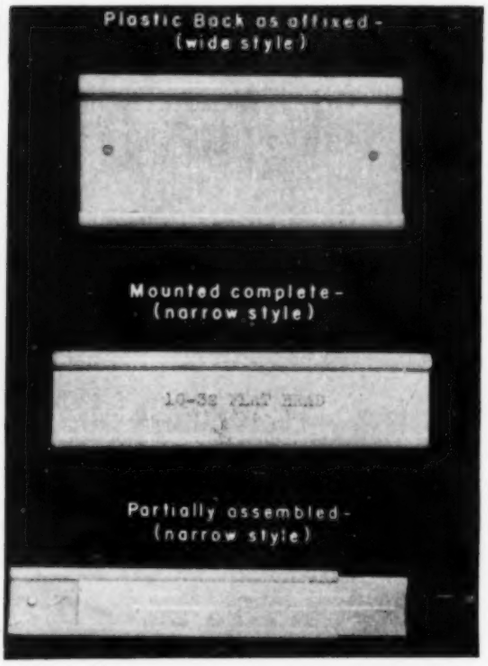
Laughlin's complete line of wire rope and chain fittings is distributed through Mill, Mine and Oil Field Supply Houses

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN *Company*
PORTLAND 6, MAINE

Look for Laughlin Products in Thomas Register.

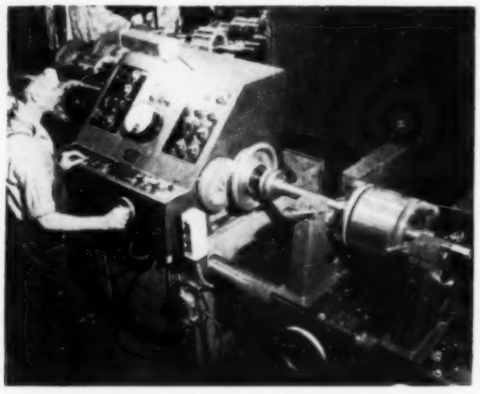
BIN CARD HOLDERS, made of ivory plastic, are available in variety of shapes and sizes. Applicable to any flat surface, they consist of plastic holder itself, insert tab on which description of



article may be typed and covering sheet of transparent plastic. Changes are easily made by inserting revised card slips. Material is washable.—**Plastic Division, Hollywood Athletic Co., 211 E. 7th St., Los Angeles 14, Calif.**

★ ★ ★

DYNETRIC BALANCING UNIT makes it possible to precision balance armatures for 50- to 200-h.p. motors to 1/10,000 of an inch of linear movement. Operator proceeds as follows: Places shaft of armature in floating bearings; connects it to that



of motor-driven sine wave generator; adds known weight of molding clay to one end at 0 reference point of generator index wheel; rotates armature at 600 rpm.; manually adjusts generator until rotor is in phase with stator, at which point armature is in balance with machine; weight of metal necessary to bring one end of armature in balance is read on scale of large instrument in center of panel, and horizontal movement of armature, due to vibration, is transmitted by floating bearings through

Ransome PAVERS

. . . set the pace on airport runway construction

34E DUAL DRUM PAVER ON AIRPORT CONSTRUCTION WORK

PORTABLE MIXERS

HORIZONTAL AND HI-UP TRUCK MIXERS

CENTRAL PLANT MIXERS

During the early days of the war, Army and Navy training programs called for the construction of a great many large airports . . . in the shortest possible time. Ransome Pavers went to work laying runways and hangar aprons.

These big machines, producing up to 121½ cubic yards per hour with a one minute mixing time, stayed on the job as long as twenty-four hours a day, seven days a week. New production records were hung up—airports were finished far ahead of schedule.

Ransome 34-E Dual Drum Pavers have many features making for efficient operation and trouble-free performance. Write for literature.

RANSOME

MACHINERY COMPANY

DUNELLEN N. J. - U. S. A.

SUBSIDIARY OF WORTHINGTON PUMP AND MACHINERY CORPORATION

AMERICAN
STEEL DERRICKS
Speed vital construction

Here's why

They are the product of the combined experience and "know how" of two great organizations of derrick specialists. In the guy, stiff leg, steel erectors and special types they are available in a wide range of sizes, in length of boom and lifting capacity.

If it is a derrick job, there is an AMERICAN for it.

The erection of roof trusses by the contractor on this job was done from the ground with aid of AMERICAN steel long-boom stiff-leg derricks.

Ask for Catalog D1-2-38

60 YEARS OF SAFETY 1883 — 1943 *The Genuine* CROSBY CLIP

AMERICAN HOIST & DERRICK CO.
SAINT PAUL 1, MINNESOTA
Chicago San Francisco New York
AMERICAN TERRY DERRICK CO. . . . South Kearny, N. J.

mechanical connection to electrical coil where it is electrically transmitted to electronic tubes which amplify unbalance so it can be recorded by instrument; sine wave stator index wheel indicates place on armature with respect to 0 reference point of index wheel where weight read on instrument must be added to bring that end of armature in balance; and operator then repeats these steps to balance opposite end of armature.—**Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.**

★ ★ ★

UNDERWATER CUTTING TORCH operates on 300-amp. welding machine. No hydrogen is required and oxygen used is low. Cuts gash wide enough for man to put his hand through. Electrodes used are 12 in. long and made of brass tubing and cast iron. May be charged by diver while under water. Depth of water does not affect cutting efficiency. It will cut cast iron and brass and metal cut need not have clean surface.—**Swafford & Hancock, Box 566, Batesville, Ark.**

★ ★ ★

HARD OVERLAY METAL, called Kerk-Aloy, restores efficiency to worn metal faces, edges and surfaces. Is able to bond homogeneously with any metal except lead and aluminum. Claimed to be highly efficient on harrow points, steam shovel lips and dredge lips or dippers and other equipment used to long hard service. Can be applied with acetylene torch or electric arc, does not require use of bonding fluxes, and flows evenly without characteristic of gasification.—**Kerk-Aloy Co., Bloomington, Ind.**

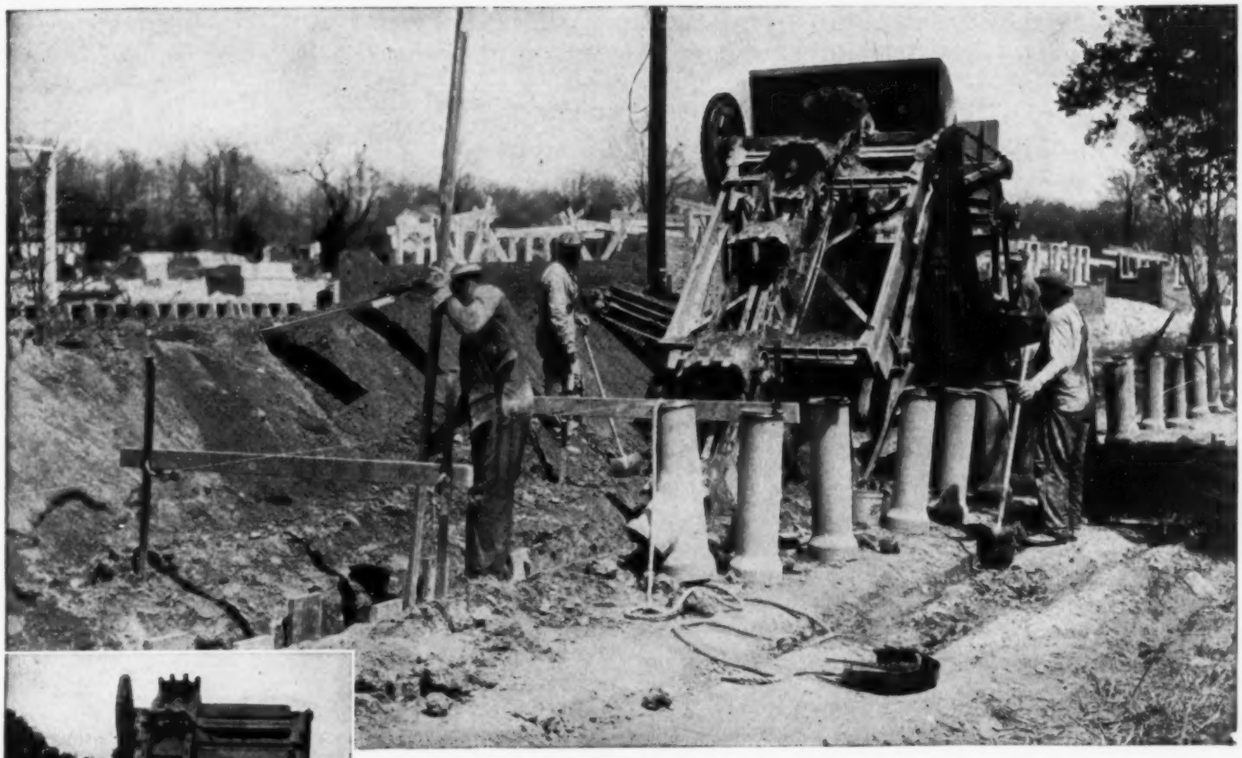
DO YOU
Operate Diesels?

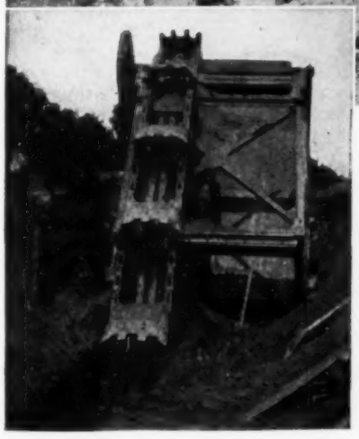
Then here's a timely wartime tip on how you can guard against engine overheating, increased oil consumption, loss of power, scored cylinders. Keep the cooling systems of your Diesel or gas engine units SCALE-FREE by using FAST-WORKING Oakite Compound No. 32. You will find it removes deposits THOROUGHLY without harming basis metal. Free, 28-page illustrated manual gives complete, helpful data. Write for YOUR copy NOW!

OAKITE PRODUCTS, INC.
24G Thames St., New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**

PARSONS





Parsons Trencher cutting ditch between pavement edge and steep bank. Only an offset boom could work in these restricted quarters successfully.

TRENCHERS Set Pace for Housing Projects

Parsons' speed and dependability made them first in the field when cantonments, airports and ordnance plants were constructed. And now Parsons Trenchers continue to set the pace in housing jobs throughout the country. Sewer, water, gas and electrical distribution systems must be completed first before homes can be built. Only because these machines are compactly built with alloy steels, anti-friction bearings and enclosed hardened gearing can uninterrupted, profitable operation continue. The original Parsons' patent — Offset Boom — permits excavations in narrow alleys or on road shoulders, making trenching possibilities unlimited. Speed and profit are easily available on housing projects with a Parsons Trencher.

SEE YOUR NEAREST DEALER TODAY.

THE PARSONS COMPANY • NEWTON, IOWA

TRENCHING EQUIPMENT

PARSONS

Whiteman CONCRETE EQUIPMENT

Has proved its value in saving labor and speeding construction on many war projects. The WHITEMAN Rodding Machine, the combination Floating-Finishing Machine, the Hand Grill Tamper and the Screed Stake Cap (illustrated at right) are available on properly rated orders.

For information see your nearest distributor or write direct.

Whiteman MANUFACTURING CO.

3249 Casitas Avenue **Los Angeles 26, California**

WELLMAN **Williams Type** **BUCKETS**

Welded Rolled Steel

FOR GREATER STRENGTH AND LONGER SERVICE

Wellman Buckets combine all the mechanical advantages of the famous Williams Bucket with the welded construction features formerly found in Wellman custom-built heavy duty steel mill buckets.

Send for Free Bulletin

Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN-WILLIAMS.

Multiple Rope and Power Arm Types.
Dragline • Power Wheel • Dredging.
Special Service Buckets
⅜ to 16½ Yd. Capacities.

THE WELLMAN ENGINEERING COMPANY

7017 Central Avenue **Cleveland 4, Ohio**

SALES AND SERVICE AGENCIES IN PRINCIPAL CITIES

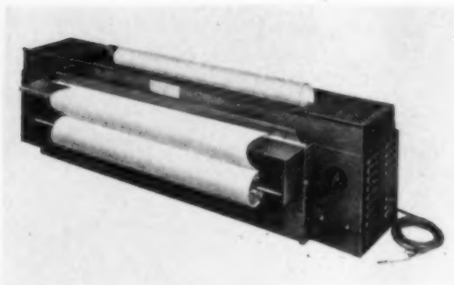
FOUR-CYLINDER ENGINE, Model D140, has piston displacement of 140 cu. in. and develops up to 33 hp. at 2,400 rpm. Has valve-in-head arrangement and wet cylinder sleeves, with drop forged, counterweighted crankshaft, extra large main bearings, vertical magneto, drop forged connecting rods, precision bearings, oil bath air cleaner, valve seat inserts, full pressure lubrication, and conveniently located controls.—**Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis.**

★ ★ ★

SOUND PROOFING prevents increase in transmission of noises following installation of air conditioning systems, whose ducts frequently act like speaking tubes, carrying sounds from one room to another. Q-T Ductliner is thermal insulation material composed of rock wool formed into pads with special binder for use in sheet metal and other ducts. Is both moisture and fire resistant.—**Celotex Corp., Chicago, Ill.**

★ ★ ★

CONTINUOUS PRINTERS, Models B-1 and B-2, produce blueprints or direct process black and white prints up to 44 in. wide in any lengths at speed up to 42 in. per min. at cost of 1 to 1¼c. per sq. ft., including labor. Are compact, easily portable, can be placed on table or bench. No special wiring is required. Use of Cooper-Hewitt mercury vapor tube lamps mounted horizontally gives absolute uniform light intensity overall. Super-clear hand-polished contact glass and sliding contact insure clear, clean overall exposure. No lubrication is required.—**Peck & Harvey, 4327 Addison St., Chicago, Ill.**

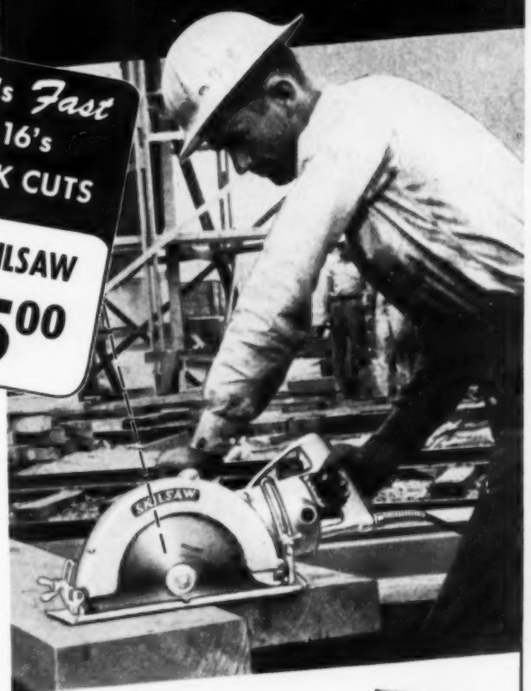


MODEL "127"

SKILSAW HAS THE EXTRA CAPACITY AND SAWING SPEED *You Need!*

SAWS 4 x 12's *Fast*
SAWS 8 x 16's
IN TWO QUICK CUTS

MODEL "127" SKILSAW
only $195.00



Today's heavy-timber construction means more tough sawing jobs for you . . . and that means you need Model "127" SKILSAW! It's got extra capacity for all the extra-deep cutting that's called for on aircraft plants, bridges and big projects of every kind. And Model "127" has extra power for extra speed on every cut. Saws 4 x 12's fast . . . saws 8 x 16's in two quick cuts . . . rips, cross-cuts and bevels!

Model "127" SKILSAW . . . with a cutting capacity of 4⅜ in. . . . is still light, compact, easy-to-handle. Even inexperienced operators will give you immediate time, money and manpower savings. Ask for a demonstration. You'll be glad you did!

SKILSAW, INC.
5045 Elston Ave., Chicago 30, Ill.
Sales and Service Branches in All Principal Cities

FREE! TOOL MAINTENANCE MANUAL AND NEW SKILSAW CATALOG!

There's a Big Special Section on *How to Get the Most from Your Electric Tools in War-time* . . . in the new SKILSAW CATALOG!

SEND FOR YOUR FREE COPIES NOW!

SKILSAW PORTABLE ELECTRIC TOOLS

★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

OWNERS SAY THESE ARE "THE PULLING-EST" TRUCKS THEY EVER OPERATED

With the armies of our own and allied countries, and in the world's most difficult civilian services, Marmon-Herrington *All-Wheel-Drive* trucks have won the highest praise from the men who drive them.

Wherever the "going" is particularly tough, as in the oil fields, pits and quarries, logging camps, road building and road maintenance, etc., these trucks get the hardest jobs—*and eat them up!* They are especially adapted to the gruelling service of snow-removal, and for building and maintaining power, light, telephone and telegraph lines across country, in all kinds of weather, over all kinds of terrain.

The application of power and traction, through a vehicle's front wheels, as well as its rear wheels, gets results that are unattainable in any other manner.

Marmon-Herrington developed the Heavy Duty *All-Wheel-Drive* truck to new heights of performance, and introduced the conversion of standard trucks to *All-Wheel-Drive,* long before the war began. Still greater automotive triumphs are promised for the period of reconstruction that is to follow.

Remember Marmon-Herrington when peace comes, and trucks again become available to all who need them. We hope that time will not be long in coming.

MARMON-HERRINGTON

All-Wheel-Drive

MARMON-HERRINGTON COMPANY, Inc.

CABLE ADDRESS: MARTON • INDIANAPOLIS 7, INDIANA, U. S. A.

HYDRAULIC JACKS of 30- and 50-ton capacity have high and low speed pumps that can be operated singly or in unison. Claimed to be sturdy, dependable and easy to operate. Base is made of special

---

Today our armed forces are getting every available Byers

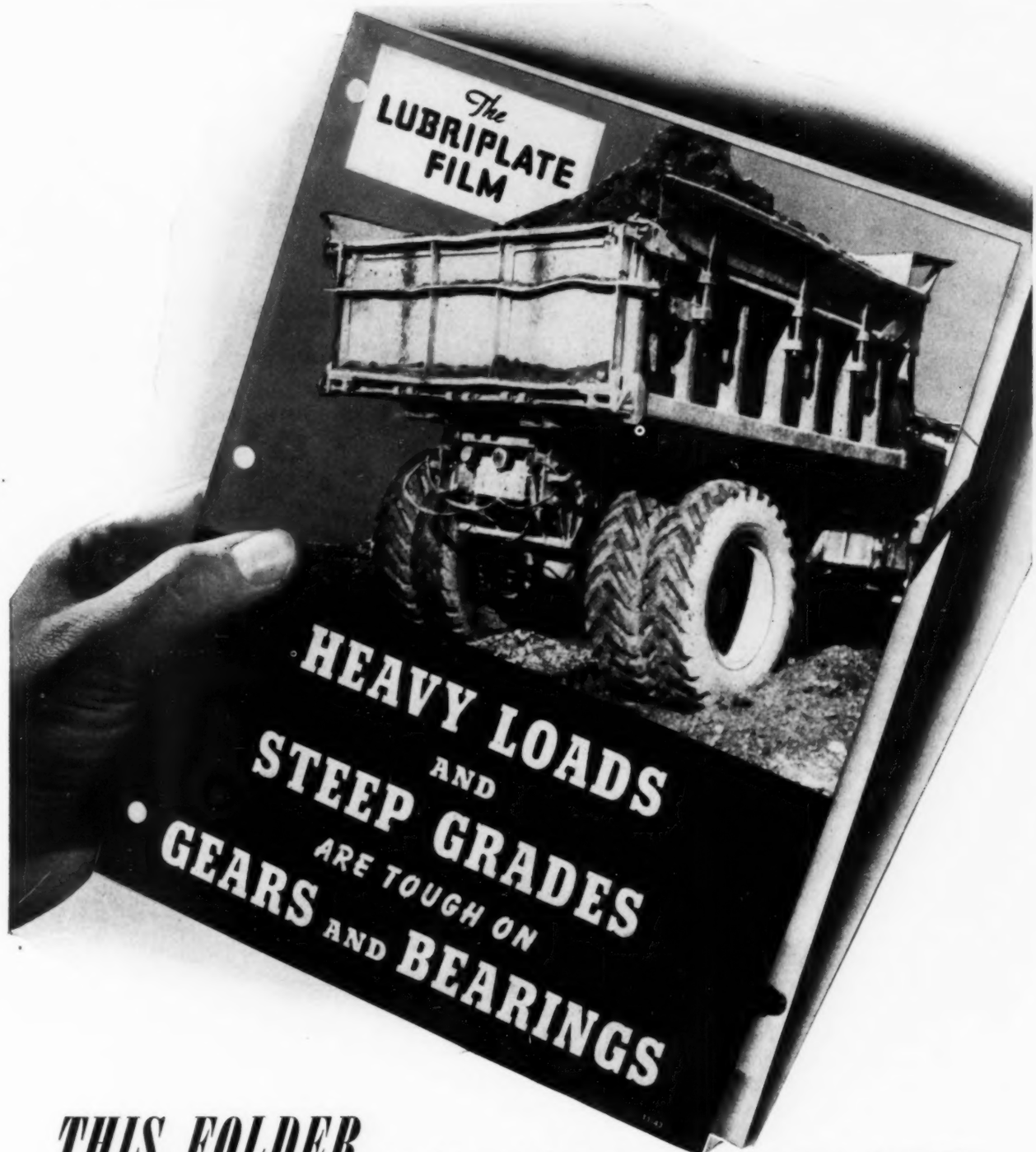
When the War is Over . . .

BYERS will offer you new, improved, faster, mobile shovels and cranes for peacetime jobs . . . and you'll get them

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Parts Service to help them keep present equipment working steadily and satisfactorily.

BYERS CRANES AND SHOVELS RAVENNA, OHIO

DISTRIBUTORS THROUGHOUT THE WORLD



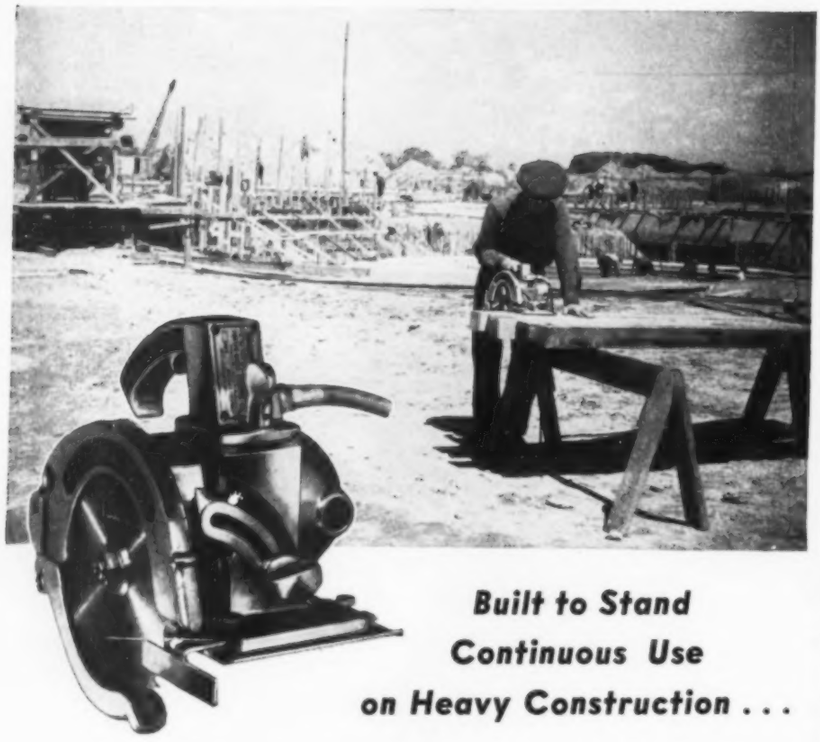
THIS FOLDER **gives the case-history of a truck that was operated on 12% to 15% grades with heavy overload for 3600 hours without apparent wear to gears. This was due to LUBRIPLATE lubrication. Learn how you too, can save on your truck and tractor repairs. Send for a copy today.**

LUBRIPLATE DIVISION

FISKE BROTHERS REFINING COMPANY

NEWARK, N. J. **SINCE 1870** TOLEDO, O.

WRITE FOR THE NAME OF THE DEALER NEAR YOU



Built to Stand Continuous Use on Heavy Construction . . .

Speedmatic
ELECTRIC HANDSAW

Big operators never think of an electric handsaw as a substitute for an ordinary handsaw. They think of it as a power tool. And they plan their jobs so that these power tools are in operation every minute of the day—turning out mass production on the job and insuring a much higher construction rate per man.

Of course, the Porter-Cable SPEEDMATIC Electric Handsaw *can* be used as an ordinary handsaw and it *will* give you much faster cutting when used that way. But to know the full possibilities in SPEEDMATIC, plan the job so that it can be kept cutting every minute of the day. It's built to take that sort of sawing. The extra capacity motor with the smooth, non-jam helical gear drive (that delivers more power to the cutting edge) both guarantee that SPEEDMATIC can keep going at top speed from morning to night, with a minimum of maintenance expense.

More — SPEEDMATIC'S balanced, one-hand grip, and the broad shoe, make it so easy to use that the operator doesn't tire and slow down, either.

PORTER-CABLE
MACHINE COMPANY
1920-1 N. Salina St.
SYRACUSE, N. Y.

FREE
DEMONSTRATION

Don't take our unsupported word for what a SPEEDMATIC Saw will do for you. Ask for a demonstration—no charge, no obligation. Just 'phone the local Porter-Cable man or dealer (name in classified 'phone book), or drop a postcard for full details.

analysis solid steel bar stock which adds to load bearing security. Jacks have two release valves located on opposite sides of base for operator's convenience. Either release screw controls ram return. Easy carrying grip is feature of high-speed pump.—**Templeton, Kenly & Co., Chicago, Ill.**

★ ★ ★

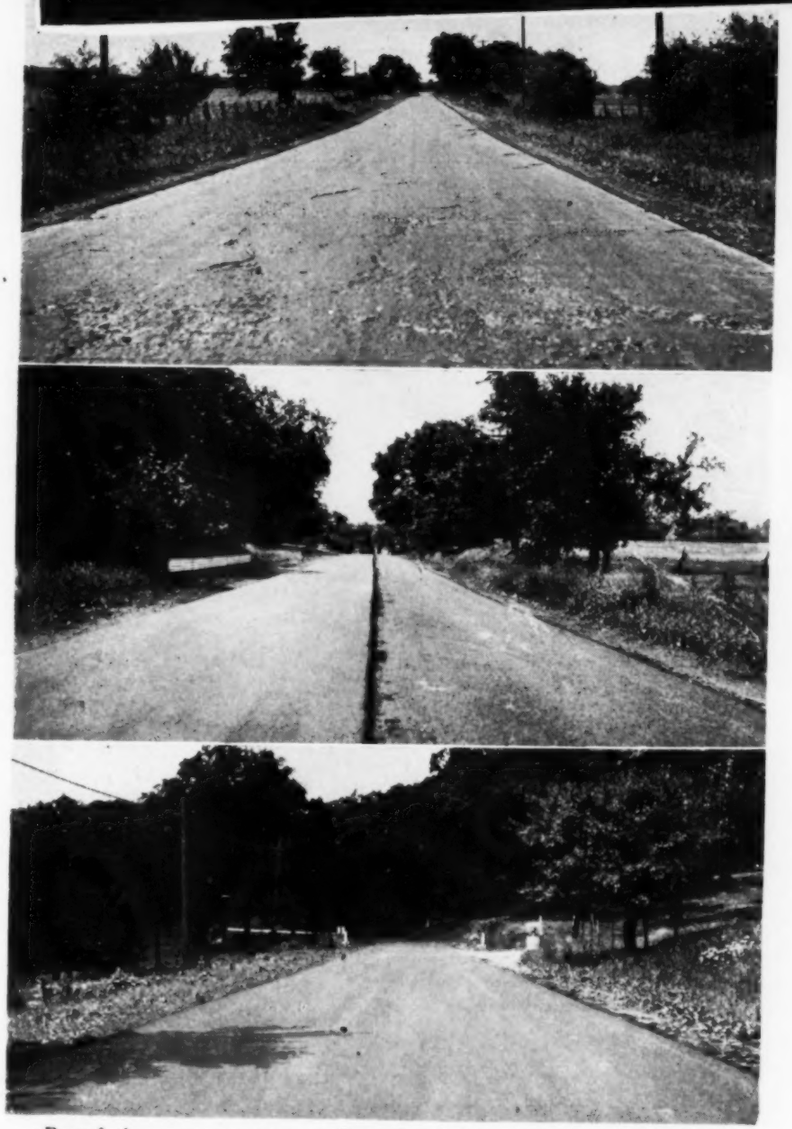
DRUM OPENING TOOL cuts in one quick easy thrust as it firmly grips outside of barrel. Cuts smoothly, evenly, folding cut edges in close to barrel. Eliminates usual risks involved in opening and

handling medium weight and light drums. Is especially adapted to opening drums used for shipping chemicals, corrosives and other materials. Made of steel drop forgings. Hardened and tempered, it can be resharpened when necessary.—**Merrill Bros., 36 Caspian St., Maspeth, Brooklyn, N. Y.**

★ ★ ★

BAROMETER AND ALTIMETER combine high sensitivity and precision for use in meteorology, surveying, airport service, research work and as standard for calibrating other instruments. Have sensitivity of one part in 8,000. Pointer moving over mirrored 5-in. dial makes practically two revolutions in traversing full scale range, which is equivalent to linear scale of approximately 29 in. and permits scale readings to 1 ft. altitude or .05 millibars pressure. Inherent temperature compensation is extremely high, so no special compensating elements are necessary. For portable service, they are available in shock-proof protective cases and can also be furnished for wall or panel mounting.—**Wallace & Tiernan Products, Inc., Belleville, N. J.**

SAVED for vital wartime traffic



Resurfacing worn concrete on State Trunk No. 31, south of Elgin, Ill. Center photograph shows TEXACO Asphaltic Concrete binder course on the right and the TEXACO Asphaltic Concrete wearing surface on the left.

With transportation a vital part of the war effort, worn-out sections of strategic highways must and are being corrected.

Take this section of State Trunk 31 in Illinois, for example. When it could no longer serve wartime traffic efficiently, the highway department employed a type of improvement which has been used widely by many States, including Illinois.

After the worn highway had been primed with emulsified asphalt a 3-inch TEXACO Asphaltic Concrete pavement was constructed in two courses, each 1½ inches thick. A resilient, easy-riding, heavy-duty pavement is obtained at moderate cost, which will take hard wear for years with minimum upkeep.

When you plan your post-war highway program, make provision to resurface worn highways having adequate bearing strength with TEXACO Asphaltic Concrete. A TEXACO Engineer, who specializes in Asphalt construction, is at your service.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd St., New York City
Philadelphia Richmond Boston Chicago Jacksonville Houston

TEXACO REG. T. M.

TEXACO ASPHALT

YOU'LL BE LOOKING FOR NEW EQUIPMENT

WARCO ROAD MACHINERY OFFERS THE RIGHT MACHINE FOR ANY JOB

HYDRAULIC CONTROL MOTOR GRADERS • HYDRAULIC SCOOPS • ROAD ROLLERS • TERRACING GRADERS • ROTARY SCRAPERS • MULTIPLE BLADE ROAD MAINTAINERS.

WARCO Machinery can now be purchased on WPB releases or approval. When normal purchases can again be made give consideration to the WARCO Line, which will surprise you with its versatility and economy.

LET'S WIN THIS WAR
LET'S BE READY FOR PEACE

W. A. RIDDELL CORPORATION
Bucyrus, Ohio

SLIDE RULE is made with plastics as substitute for scarce materials. Tempered plastic has been developed by Emeloid fabricating methods, which is light weight, low in cost and accurate. All instruments are made to order.—**Emeloid Co., Inc., 287 Laurel Ave., Arlington, N. J.**

★ ★ ★

BAND FILER is available for file broaching operations on metals, alloys, plastics, fibers, and wood. Wood pressure and filing speeds are under absolute control of operator which assures surface that is "machined finish." Uses DoAll precision file bands to get continuous filing operation, thus eliminating "back-stroke" and doubling production time as files

are cutting all the time. Extensive tests show filing action is 9 times faster than hand filing and 4 times faster than reciprocal machine filing. Twelve different types and sizes range from ¼ to ⅜ in. wide in ovals, half rounds or flats. Is all steel welded machine, offering large throat capacity of 15½ and thickness capacity of 6 in. All controls are conveniently located for ease in operation, with blower for removing chips at point of work and portable lamp to light work at any angle desired by operator.—**Continental Machines, Inc., 1301 Washington Ave. South, Minneapolis 4, Minn.**

★ ★ ★

NYLON ROPE is said to be about twice as strong as manila rope of same thickness, but is only one-half to two-thirds as heavy. Under stress of sudden pull, it stretches rapidly but recovers slowly to make it perfect shock absorber. Absorbs much less water than manila, another weight advantage in rainy weather. Also has high resistance to abrasion.—**E. I. du Pont de Nemours & Co., Wilmington, Del.**

Deep Trench Digging—

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment *NOW*, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

WITH KOEHRING HIGH SPEED PULL SHOVEL

Dig ditches faster with the Koehring Pull Shovel — because of lighter weight — longer reach — better vision — greater strength. Deep or shallow trenches are dug with equal speed and efficiency. Exceptionally high hoist line speed gets the loaded bucket out of the trench. Quick and easy dumping "gets rid of the dirt." All operations are faster, increasing production to a new "high." Easy steering and moving in tight spots, accurate boom control, stable operation, and quick moves on or between work locations are Koehring advantages.

KOEHRING COMPANY • *Milwaukee 10, Wis.*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

★SAVE 7 WAYS with Mall TRADE MARK Concrete Vibrators

★★Immediate delivery on Gasoline Powered 1½ H.P., and wheelbarrow or round base mounted 3 H.P. units on suitable priority.

EASILY CARRIED BY ONE MAN

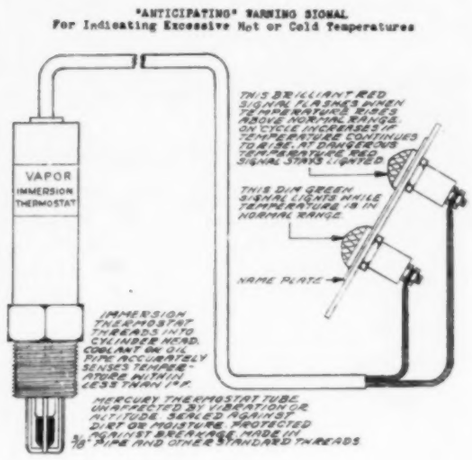
1½ H. P. GASOLINE POWERED UNIT

1. Place a stiffer mix and save sand, water and cement.
2. Eliminate expensive hand patching after forms are removed, because MALL vibrated concrete is free from honeycombs and voids.
3. Use less labor.
4. Finish work faster and get stronger, water-tight concrete.
5. Strip forms earlier and release form boards for other use.
6. Reduce power and maintenance costs.
7. Variable speed engine operates 8 other tools eliminating need for separately powered tools.

Write for literature and prices.

MALL TOOL COMPANY
7757 SOUTH CHICAGO AVE., CHICAGO 19, ILL.

WARNING SIGNAL indicates excessive hot or cold temperature. Available for any temperature ranges from —60 deg. F. to 500 deg. F. for use in oil, Prestone or other liquids or gases. Maintains original accuracy for years. Immersion thermostat


"ANTICIPATING" WARNING SIGNAL
For Indicating Excessive Hot or Cold Temperatures
VAPOR IMMERSION THERMOSTAT
THIS BRILLIANT RED SIGNAL FLASHES WHEN TEMPERATURE RISES ABOVE NORMAL RANGE. ON CYCLE INCREASES IF TEMPERATURE CONTINUES TO RISE. AT DANGEROUS TEMPERATURE, RED SIGNAL STAYS LIGHTED
THIS DIM GREEN WARNING LIGHTS WHILE TEMPERATURE IS IN NORMAL RANGE
NAME PLATE
IMMERSION THERMOSTAT THREADS INTO CYLINDER HEAD. COOLANT OR OIL TUBE ACCURATELY SENSES TEMPERATURE WITHIN LESS THAN 1°F.
MERCURY THERMOSTAT TUBE, UNAFFECTED BY VIBRATION OR ALTITUDE, SEALED AGAINST DIRT OR MOISTURE. PROTECTED AGAINST BREAKAGE. MADE IN ⅜" PIPE AND OTHER STANDARD THREADS

weighs less than 5 oz. No relay required. Signal on lamps can be located as far as necessary from source of temperature. Rugged construction will withstand rough use and severe vibration. Low in cost, simple to install and uses only sufficient current to operate signal lights or similar signal devices.—**Vapor Car Heating Co., Inc., 80 E. Jackson Blvd., Chicago, Ill.**

★ ★ ★

CENTRIFUGAL CLUTCH, which can be produced in unlimited range of sizes and capacities, can serve either as coupling between shafts or as driving pulley or gear in transmission, as well as starting cushion between power units and driven mechanisms. Known as Torkontrol, it consists of

partially filled oil chamber fitted with freely rotating hub, which carries series of movable wedge-shaped flyweights. Works equally well in either direction and is set to engage or release at given speed and to slip in case of overload. Maker claims it permits use of smaller engines or motors which start without load, give smooth cushioned application of power, straight line accelerations with resulting saving in operating cost.—**Amalgamated Engineering & Research Corp., 100 W. Monroe St., Chicago 3, Ill.**

USE A GRACO CONVOY LUBER

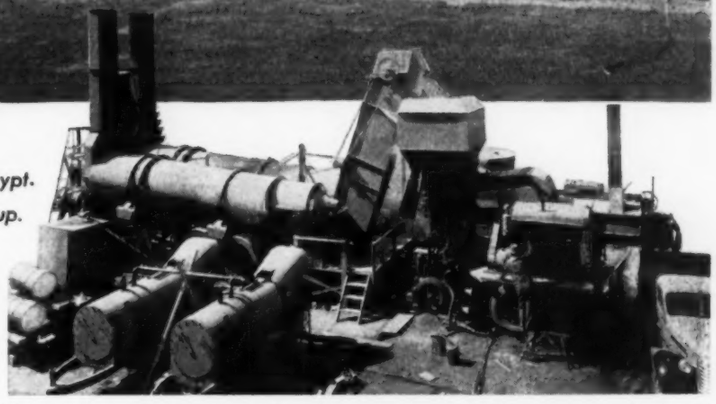
These portable—completely self-contained field lubrication units are doing a big job for both large and small contractors on all kinds of projects and on all types of equipment. Your equipment lubricating problems can be materially speeded up—with big savings in manpower—by using a GRACO CONVOY LUBER.

• • •

Investigate the advantages of portable air powered high pressure field lubrication. See your distributor or write for new catalog No. 135 for detailed information.

GRACO
GRAY COMPANY, INC.
MINNEAPOLIS • MINNESOTA

SWIFTER ROADS TO ALL FRONTS



Top, B-G Finisher constructing highway near airport in Egypt. Bottom, B-G Army Asphalt Plant in central plant set-up.

Mobility, America's secret weapon, is winning the war on all fronts. First demonstrated at the Battle of the Marne, World War I, when Paris garrison troops were moved by taxicabs to turn the German army.

Today, Allied motor convoys miles long travel hundreds of miles in a few days—a constantly shifting, hard-hitting force. The German Panzer units of Blitz fame are being out-blitzed on swiftly constructed highways and runways!

The U. S. Army Engineers who make these movements possible use modern construction equipment to build their roads, landing strips and bomber bases right up to the front lines. The same type of equipment that will provide a vast network of roads and airports after the war for civilian mobility — for business and pleasure. 44-1

ARMY E NAVY

BARBER-GREENE

AURORA, ILL.

CLEAVER-BROOKS TANK-CAR HEATERS . . .
THEY'RE WEARING WAR PAINT
NOW . . . AND DOING "Plenty"
AT HOME and OVERSEAS . . .
TM5-1014
WAR DEPARTMENT

CLEAVER-BROOKS Tank-Car Heaters are serving with the Army and Air Corps engineers on the far-distant fronts of global war as well as home bases. Besides their basic task of providing fast, efficient heating of road oils, and asphalt, Cleaver-Brooks Tank-Car Heaters are doing scores of other important jobs for the military—heating water for showers for several hundreds of soldiers at a time—providing live steam to clean off grease on engines in motor trucks—and even being used for vulcanizing operations to re-tread old tires on military equipment.

Here in the "States" Cleaver Brooks Tank-Car Heaters are on full-time duty—helping to build and maintain essential highways, auxiliary airports and flight strips.

There's good reason why these Heaters are having "plenty" to do—no other equipment equals Cleaver-Brooks in fast, low-cost performance—no other equipment has the original and exclusive four pass down-draft flue travel and integral burner construction, plus the positive dry-coil method of condensate return.

Get complete information on Cleaver-Brooks Tank-Car Heaters and Bituminous Boosters now—for the jobs to come at war's end.

Cleaver-Brooks Co., 5125 No. 33rd St., Milwaukee 9, Wisconsin, U.S.A.

Cleaver-Brooks

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS

FOR VICTORY ON EVERY FRONT IN 1944

•

BUY WAR BONDS!

Florida sewer trench bonedried with a MORETRENCH WELLPOINT SYSTEM.

MORETRENCH CORPORATION

90 West Street, New York 6, N.Y.

CHICAGO, ILL. ROCKAWAY, N. J. NEW ORLEANS, LA.

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

SIXTY-SIX YEARS OF GROWTH—**Mengel Co.,** Louisville, Ky. (16 pp., two color) Traces and illustrates company's history, products and executive and rank-and-file personnel. Numerous sketches and photographs detail company's many ramifications into variety of industries and trades supplied with veneers, plywoods, lumber and machined wood products, complete bedroom suites and other parts of pre-fabricated and other houses. Book stresses current concentration on war production, illustrated by such war products as Army cargo truck body parts, aircraft plywood, military boat plywood, boxes for fighting services, airplane engine boxes, and airplane crates.

★ ★ ★

MANGANESE STEEL—**American Manganese Division, American Brake Shoe Co.,** Chicago Heights, Ill. (32 pp., illustrated) Shows how manganese steel is helping reduce costs in construction industry, how equipment parts of this material endure shock of violent contact with rock, ore and other destructive forces. Describes exhaustive research that has made it uniformly durable and describes work on several big jobs as its practical application.

★ ★ ★

LIGHTING HANDBOOK—**Westinghouse Lamp Division,** Bloomfield, N. J. (175 pp., illustrated; cost $1) Designed as practical guide and working reference book for lighting engineers, designers, architects and builders, book on lighting was prepared by Westinghouse company's Illuminating Engineering Department. Feature of handbook is series of charts which coordinate room index, fixture efficiency, and coefficient of utilization curves and provide new and graphic method of determining desired illumination for various applications. Charts cover industrial and commercial fluorescent and incandescent lighting and provide means of calculating quickly number and size of lamps needed with practically every type of lighting fixture. Book is divided into two parts, chapter headings in first section including lighting terms and measurements, recommended levels of illumination, interior lighting design calculations, interior wiring for lighting. In second half, devoted to specific lighting applications, there are chapters covering store, office, school, public buildings, industrial, architectural, aviation, street and highway lighting.

Nothing changed but the paint

EVERYTHING changed but the paint

LONG before Pearl Harbor your government called International Diesels to the nation's defense. Regulation olive-drab replaced the familiar red, and the big tractors of industry went to war. *Almost nothing was changed but the paint.*

These peacetime crawlers are writing war history in stirring action. They're pulling big guns, handling bombs for the Air Forces, smoothing shell-torn landing fields, clearing jungles, building roads. Tens of thousands of such International Tractors are valiantly supporting the Marines, the Navy, and the Army. Night and day we're building more. They're tops on every fighting front.

But that's not enough for American resourcefulness under the spur of war.

In 1943 a new "prime mover" rolled from the International assembly lines—a tractor in which *EVERYTHING was changed but the paint!*

Here's a revelation in crawler power, maneuverability and fighting quality . . . a high-speed performer under heavy load . . . a go-getter whose rugged construction and ease of handling will carry far beyond the Victory.

Victory is its one job, but there'll be a world to rebuild later. Then we'll build the International Diesel Crawlers you need. And you'll know why Harvester men are saying today: *"We've got a lot of things packed into this big baby that we'll use when the war is over!"*

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

BUY BONDS···BUY MORE BONDS

INTERNATIONAL HARVESTER

DUFF-NORTON Jacks

No matter what the job may be, Duff-Norton Jacks can help you with the heavy lifting and moving. These powerful, easy-to-operate Jacks provide the "mechanical muscles" that help speed the work on every construction job. Make full use of these husky helpers!

NEW STREAMLINED CATALOG

Just off the presses, the new streamlined Duff-Norton Catalog 202 gives you complete data on every Duff-Norton Jack. Write for your free copy today!

THE DUFF-NORTON MANUFACTURING COMPANY
PITTSBURGH, PENNSYLVANIA
Canadian Plant: Coaticook, Quebec · *District Representatives in Principal Cities*

ENGINEERING IN WOOD—**Timber Structures, Inc.,** 29th and N.W. Yeon Ave., Portland 8, Ore. (48 pp., illustrated) Tells story of company whose yearly production exceeds 80,000,000 b. ft. of prefabricated lumber. Details are given on research, engineering, fireproofing and wood preservation, transportation, erection, and lamination. Product use in aviation, bridges, shipyards, municipal gymnasiums, churches and schools, and industrial and commercial installations is described and illustrated.

★ ★ ★

SPEED PRIME PUMPS—**Chain Belt Co.,** 1600 W. Bruce St., Milwaukee, Wis. (20 pp., two color) Contains complete information on mechanical parts and construction of Rex pumps, how it operates and what it will do. Also includes specifications and capacity charts to aid in pump selection. Pumps are made in capacities ranging from 3,000 to 125,000 gal. per hr.

★ ★ ★

REPOINTING DIGGER TEETH—**Allied Steel Products, Inc.,** N.B.C. Bldg., Cleveland 14, Ohio. (2-p. bulletin) Tells how worn dipper, bucket or dragline teeth can be repointed quickly and economically by welding with Mango repointer steel wedge bars. Four sizes or points are available, each in 42-in. wedge bar lengths. Sections of correct width desired are torch cut from bar, tacked on, filled in where necessary, hardfaced if desired, with welding electrodes.

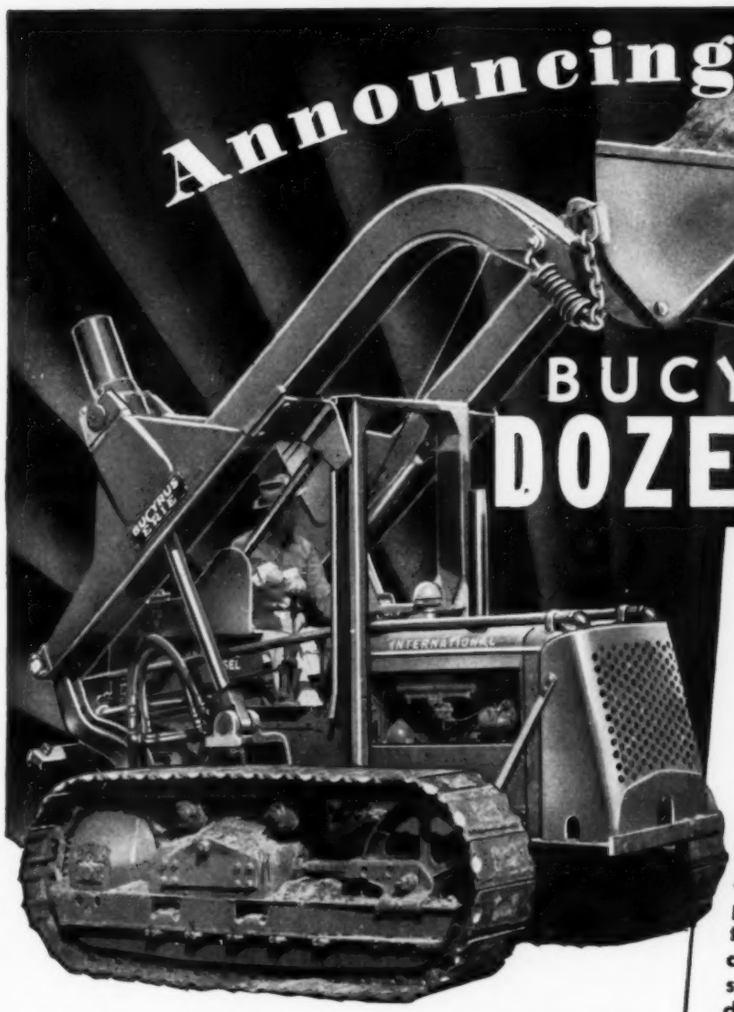
★ ★ ★

BULLDOZERS AND GRADEBUILDERS—**Baker Mfg. Co.,** Springfield, Ill. (12-p., illustrated catalog) Shows line of hydraulic bulldozers and gradebuilders as standardized on wartime basis. Prior to war bulldozers were available with two types of moldboards for each model of tractor, boxed end for excavating and regular high type for leveling, spreading, piling, backfilling and other earthmoving jobs. These two types are now combined in single moldboard which combines all functions.

★ ★ ★

ENGINEERING MANUAL—**Master Vibrator Co.,** Dayton 1, Ohio. (40 pp., illustrated) Contains essential information on portable gas-electric generator plants, including simplified explanation of power factor, load factor, mixed loads, power calculations and other vital data. It is profusely illustrated, with photographs, drawings, diagrams and tables. There are also construction views and complete specifications of 19 portable gas-electric generating plants, with valuable information on accessories.

Announcing the NEW



BUCYRUS·ERIE DOZERSHOVEL

Here's a *new* tractor equipment unit — the completely different DOZERSHOVEL for T9 and TD9 International TracTracTors. Built for the armed forces and thoroughly tested in tough military service, the Dozershovel is now available in limited numbers for civilian use under proper government release.

The Dozershovel gives you full-fledged tractor shovel and bulldozer service through unique design. Simple interchangeability permits in-the-field changeovers in just a few minutes. You get easy penetration, even in hard materials, through hydraulic control and positive down pressure on bucket or blade. Strong side arms make lifting big loads easy, dozing sure and smooth. Other features are unobstructed visibility, oscillating tracks, and low overhead clearance. Lifting crane service is made possible by a hook on the upper edge of the bucket or blade.

Get the detailed story on this economical dirt mover from your International TracTracTor distributor. The Dozershovel is a new gateway to greater profits.

● POWERFUL DIGGING AND DOZING

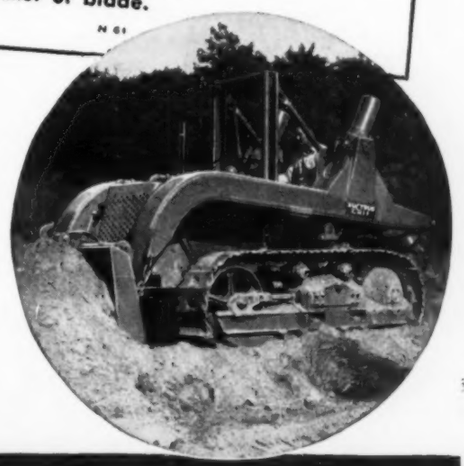
Not just another front-end shovel, the Dozershovel is both shovel and dozer. It easily digs and lifts heaping buckets, dozes full blades and level cuts. Hydraulic control and down pressure up to 4200 pounds give real "bites," even in tough materials.

● UNOBSTRUCTED VISIBILITY

No blind spots, no "guessing the load" with the Dozershovel. Its full visibility permits the operator to load full buckets quickly, to dump accurately, to doze a level surface. This feature is important in reducing operator fatigue, too.

● INTERCHANGEABILITY

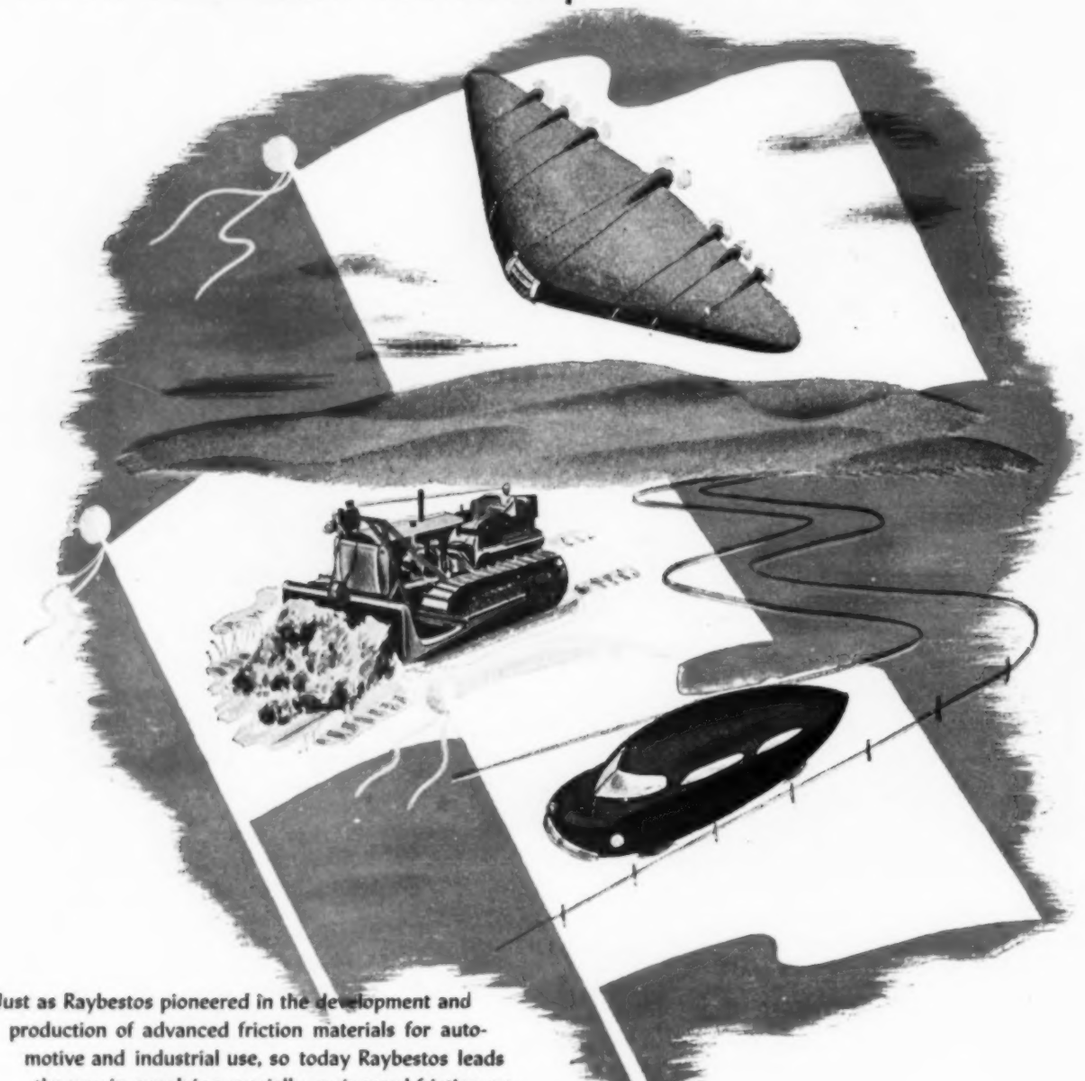
It takes only a few minutes to change over in the field from shovel to dozer. Just remove five pins holding the bucket, trip latch, and limit chains; set blade in place; replace pins, and the job is done. The bucket trip mechanism is a big help in dozing, too, for it permits tipping the blade forward to free the blade of its load on uphill work.



BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

"...on to a third leadership."



Just as Raybestos pioneered in the development and production of advanced friction materials for automotive and industrial use, so today Raybestos leads the way in supplying specially engineered friction materials for the aircraft industry. ★ And out of this proving ground of war production — are coming for you — and will continue to come — new and improved Raybestos Friction Materials — surpassing that Raybestos quality and performance which is universally accepted today.

THE RAYBESTOS DIVISION of *Raybestos-Manhattan, Inc.*
BRIDGEPORT, CONN.

ARMY E NAVY

Raybestos
INDUSTRIAL
FRICTION MATERIALS

Serving the War and Civilian Fronts with Friction Materials for Cars, Trucks, Buses, Tractors, Ships and Planes.

"CATERPILLAR" DIESELS ARE WORTH WAITING FOR!

RIGHT NOW, "Caterpillar" production is bigger than it ever was in peacetime. But when the Armed Forces have taken the machines they need so much and use so well, there are nowhere near enough left to meet the world-wide demand. The War Production Board is allocating the available balance as fairly as possible among civilians whose work is essential to the war effort. Thousands of other prospective purchasers are asked to wait for their new "Caterpillar" Diesel equipment — but it will be *worth waiting for.*

"Caterpillar" Diesel Tractors, Motor Graders, Engines and Electric Sets have been good in the past. They will be better in the future. No "dream machines," but *proved* on the toughest testing-grounds the world has ever seen — the battle fronts of this war. They'll have the same ruggedness and simplicity, the same economy and dependability you have always known and liked.

When victory comes, you won't have to wait while the factory reconverts. "Caterpillar" production lines will keep right on rolling them out, and machines will be obtainable in larger numbers than ever because of our vastly expanded output.

You'll buy your new "Caterpillar" Diesels from the same trusted dealer who knows your problems. With his help in servicing and maintaining your old machines, you can afford to wait for the equipment that is your first choice.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR
REG. U.S. PAT. OFF.
DIESEL

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

THE FIGHTING FOUR

INSPECT Look your equipment over frequently. For expert "internal" inspection of operating parts or functions, call in a trained "Caterpillar" service man. Read your Operator's Instruction Book.

LUBRICATE Use the right oil at the right time in the right place and in the right quantity. Keep the oil clean —change before it becomes dirty and deteriorated. Follow the Operator's Instruction Book.

ADJUST Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work. He'll do it well.

REPLACE Have your service-dealer replace or repair worn bearings, track rollers, pins and bushings, sprockets, cylinder liners, clutch linings. His service helps restore power and extend equipment life. Saves critical materials, too.

Sonotube

for war and post-war

Concrete Pier Forms

"Fastest finest most economical product I ever used for pier forming work"

(Statement of Contractor)

Manner of placing outside sill

6 Standard Sizes

INSIDE DIAMETER					
8"	9"	10"	11¼"	12"	13⅛"
SQUARE INCHES					
50.26	64	78.54	100	113.1	144

Smaller sizes available.

IMMEDIATE DELIVERY

Sonotube has been thoroughly tested in war construction. It will go on saving time, money, labor, and materials in post-war construction.

ARMY E NAVY

SONOCO PRODUCTS COMPANY

HARTSVILLE, S. C. MYSTIC, CONN.

ROCKINGHAM, N. C. GARWOOD, N. J. LOWELL, MASS.

FORM ENGINEERING—**Williams Form Engineering Corp.**, Grand Rapids 7, Mich. (66-p. catalog) Contains complete information on economical designing of forms. Compares material cost of clamps per cu. yd. with different types of clamps and methods of spacing. Stresses various ways of securing corners. Gives suggestions on concrete inserts and methods of securing floor and beam panels. Illustrates lag screw stud lock for demountable form panels and importance of use of vertical walers or alignment of high forms where bracing is impractical. Important construction data and tables are included.

★ ★ ★

CABLEWAYS—**Lidgerwood Mfg. Co.**, Elizabeth, N. J. (20 pp., illustrated) Describes stationary, traveling and radial traveling cableways. One of principal uses is in construction of large dams for hydro-electric development, water storage, irrigation or flood control. Illustrates numerous dam projects in which these cableways are used, including Shasta, Keswick, Boulder, Norris, Parker, Madden, Conchas, Marshall Ford, Norfork, Bonneville and Hiwasse.

★ ★ ★

Ready!—for quick reference and ALL FACTS on what UNION makes for speedy plant construction — write or wire NOW for Catalog 184E.

EST. 1900

Union Iron Works, Inc.

ELIZABETH, New Jersey

Try them on your toughest problems!

For years the Hool and Kinne Library has been providing structural engineers with the facts they need *on every problem concerned with the design and construction of civil engineering structures.* This is a library that must be USED to be fully appreciated—that is why we want YOU to use it. We want you to forget the financial side of this proposition until you have solved some knotty problem that you may be up against, —to find out how a specialist in that particular field would handle it. We want to prove to you that this library furnishes you with what amounts to the consulting services of 54 recognized structural engineering specialists.

HOOL AND KINNE'S

STRUCTURAL ENGINEERS' Handbook Library

With many newly revised sections containing up-to-the-minute STANDARDS and PRACTICE

THESE six books offer you the most complete compilation of structural engineering data ever published; they furnish you with genuinely professional information drawn from records of actual practice and written by a large staff of specialists.

They cover the how and why of foundation and substructure design and construction, the general theory of structural members, the detailed design of such members and the design of their connection with other members—they explain the principles of statics, reactions, moments and shears in beams and trusses, influence lines, methods of computing stresses in lateral trusses and portal bracing—they give details of design and construction of steel, timber and concrete structures of all types.

Examine the Library for 10 days in your home or office

6 volumes, 3575 pages, fully illustrated.

McGraw-Hill Book Co., 330 W. 42 St., N. Y. 18

You may send me **Hool and Kinne's Structural Engineers' Library** for my inspection. If the books prove satisfactory, I will send $3.50 in 10 days and $3.00 per month until I have paid the price of the books, $27.50. If the books are not what I want, I agree to return them postpaid within 10 days of receipt.

Signature .....

Home Address .....

City and State .....

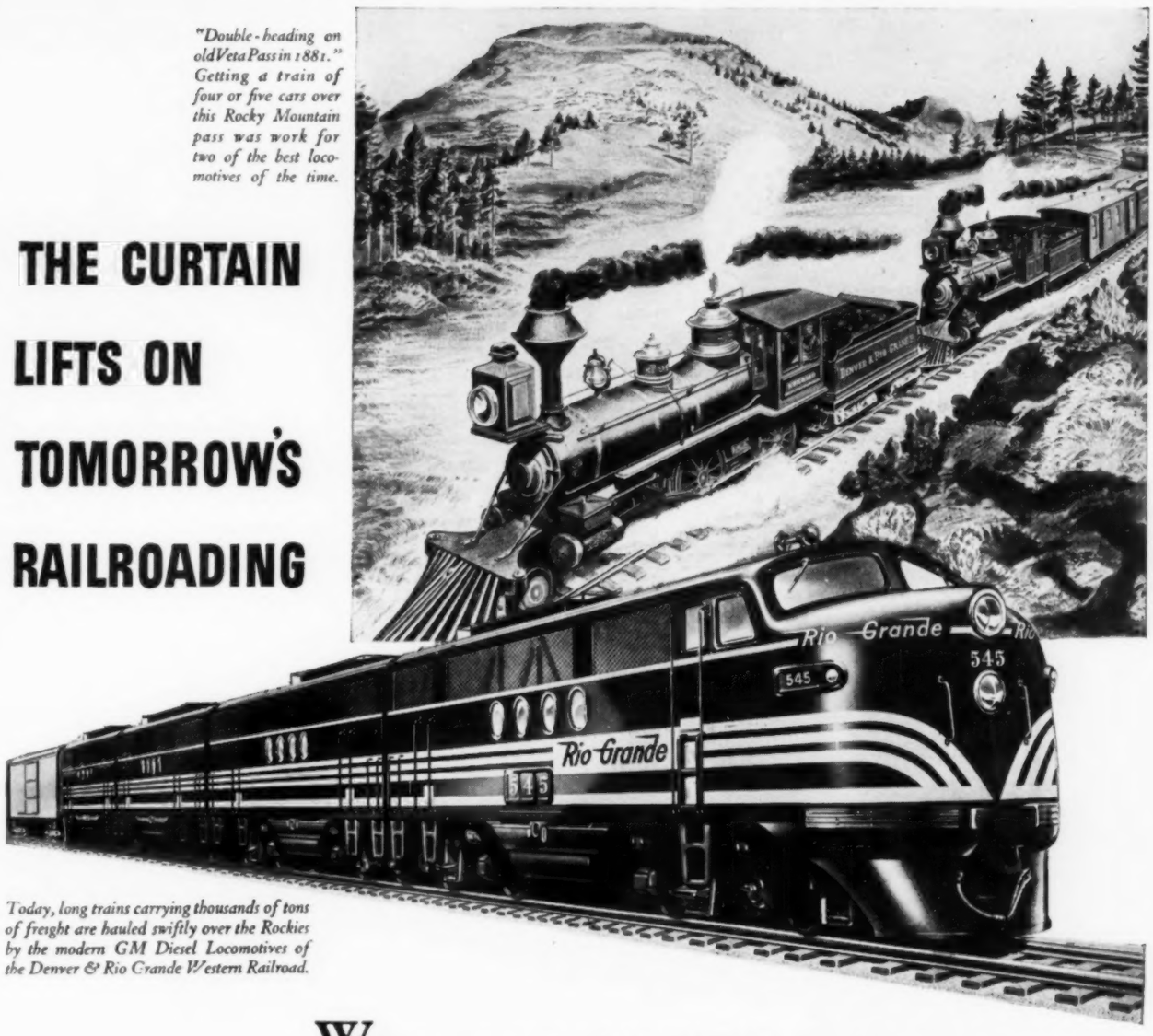
Name of Company .....

Occupation .....

(To insure prompt shipment write plainly and fill in all lines.) C.M. 1-44

"Double-heading on old Veta Pass in 1881." Getting a train of four or five cars over this Rocky Mountain pass was work for two of the best locomotives of the time.

THE CURTAIN LIFTS ON TOMORROW'S RAILROADING



Today, long trains carrying thousands of tons of freight are hauled swiftly over the Rockies by the modern GM Diesel Locomotives of the Denver & Rio Grande Western Railroad.

WHEN you think of the Diesel locomotive, don't picture only the sleek, streamlined passenger trains which shorten distance and race the clock. Think too of the mainline Diesel freight locomotives which General Motors builds. These swift, dependable giants of power are contributing heavily to the astonishing war record of the railroads. They are raising the curtain on new standards of transportation keyed to the era which lies ahead.

GM
GENERAL MOTORS
DIESEL POWER

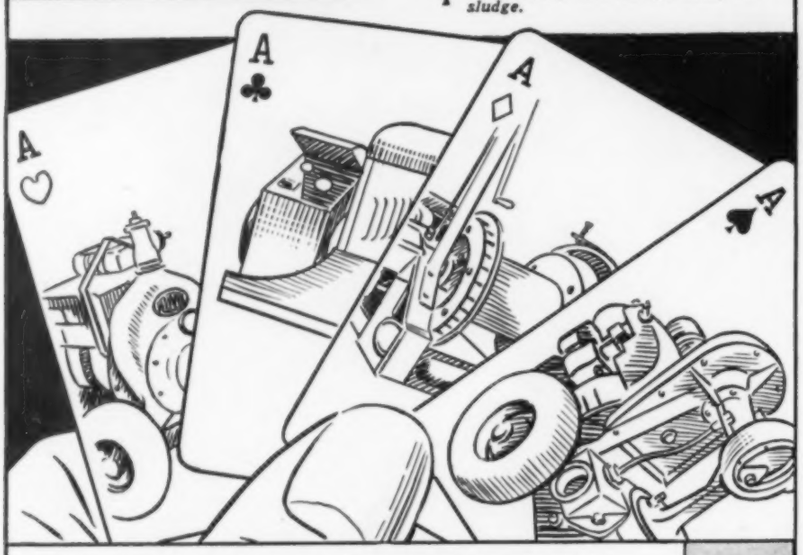
LOCOMOTIVES ..... ***ELECTRO-MOTIVE DIVISION,*** *La Grange, Ill.*

ENGINES....*150 to 2000 H.P. CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio*

ENGINES.....*15 to 250 H.P. DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.*

ACES

♡ *SELF-PRIMING PUMP handles a lot of water in a short time.*
♣ *GENERATOR-SET makes power and light on your job.*
◇ *HOIST takes the IF out of lifting.*
♠ *DIAPHRAGM-PUMP handles water heavy with mud, debris, and sludge.*



As hard to beat as four aces, that's Novo Equipment!

You gamble every time you bid on a contract. After you get a contract, your best bet is good equipment. Equipment that will do the job no matter what the odds. Equipment like Novo Engines, Pumps, Hoists and Generator-Sets.

Every piece of Novo Equipment is backed by over forty years of successful manufacturing. For your protection, it has been job-designed, factory-tested, and field-proven. When the chips are down, it will come through in the pinches!

Remember, when you have Novo Equipment, you hold the Aces.

We are currently in production on all items illustrated at the right. While most of our production is reserved for the Armed Forces, we can make limited shipments to Civilians with proper Priority.

Diaphragm and Pressure Pumps

Generator Sets

Hoists

Self-Priming Pumps

Also a member of A.E.D.

Pavement Breakers

Engines

NOVO ENGINE COMPANY LANSING, MICHIGAN

NOVO ENGINE CO., 214 Porter St., Lansing, Mich.

Please send me Consolidated Catalogue No. 4-43 showing Novo's Complete Line of Equipment.

Name: _____

Address: _____

SAFE STREETS AT NIGHT and WARTIME LIGHTING AND SAFETY—**Street & Highway Lighting Safety Bureau.** 155 E. 44th St., New York, N. Y. (Two illustrated brochures) Stress necessity of street and highway lighting plan now and as part of post-war program. Include cross-section of current thought on subject as expressed by highway economists, illuminating engineers, municipal authorities, editors, and general public. Contain articles reprinted from various publications on accidents in dimout areas; traffic safety in wartime; post-war street lighting; and post-war highway lighting.

★ ★ ★

GOGGLE CLEANING—**Mine Safety Appliances Co.,** Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa. (2-p. bulletin) Describes cabinet developed to encourage workmen to wear goggles and keep them clean. Equipped with Fogpruf, lens cleaning and anti-fogging agent, and optical wiping tissues, unit can be mounted in strategic work locations, repair rooms, tool rooms, locker rooms or on traveling goggle dispensing carts.

★ ★ ★

TIMBER CONNECTOR CONSTRUCTION—**Timber Engineering Co.,** Washington, D. C. (40-p. design manual) Offers complete design information covering use of Teco connectors, including data on load values, spacings, etc. Material is presented in chart form for ready use of architects and engineers and includes such additional information as recommended cambers for standard trusses, approximate weights of various timber connectored roof trusses and table of dimensional properties of American standardized lumber. Data presented is drawn in accordance with WPB national emergency specifications for design, fabrication, and erection of stress grade lumber and its fastenings.

★ ★ ★

SALVAGE MANUAL FOR INDUSTRY—**War Production Board.** Washington, D. C. (250 pp., illustrated) Was prepared and edited by editorial board of practical industrial salvage engineers and business paper editors. Contains systematically organized and classified information and data, most of it of "how-to-do-it" nature, on industrial salvage practice in all its ramifications. Material is presented in 26 chapters grouped into six major sections. There are two chapters on organizing and planning salvage department; three on administrative factors; 12 on methods of handling —finding, identifying, segregating, collecting, reclaiming, storing, selling, etc.—metal scrap; three on non-metallic waste; seven case histories demonstrating exemplary practice; 17-p. compilation of practical hints for handling specific waste materials; and 9-p. index. Limited supply of copies is available without charge from E. F. Mulligan, WPB Salvage Division, 1100 H St., N. W. Washington, D. C. Additional copies may be purchased at 50 cents each from Superintendent of Documents, Government Printing Office, Washington, D. C.

MAKING GRAVEL BANKS "MELT"

In less than 2 minutes, 4-yard trucks are loaded with gravel by the Athey MobiLoader on this gravel pit job. The outfit is working 10 hours per day.

With the Fast-Working Athey MobiLoader

The pressure's on a gravel bank, or stockpile when the Athey MobiLoader goes to work. It bites into the biggest of 'em and whittles 'em down in short order.

On the job shown above, a 1½-yard capacity MobiLoader is loading trucks in a gravel pit. A 4-yard truck is loaded in less than 2 minutes! The outfit is working 10 hours a day, replacing more expensive shovel equipment.

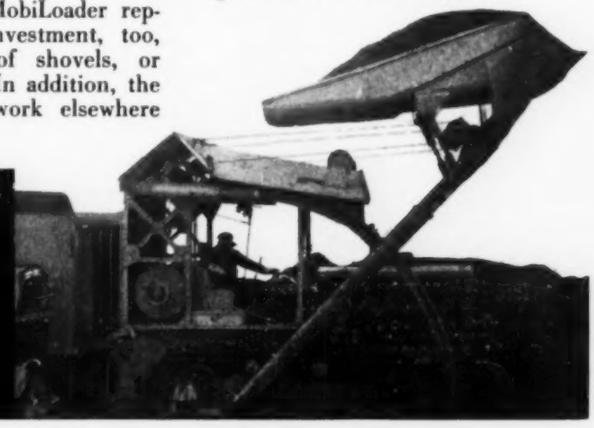
A balance of speed and big capacity gives you outstanding performance in this compact, portable tractor loader. It uses the simple overhead loading method—a loading method that has successfully cut out needless turning and maneuvering, and thus speeded up loading jobs. You dig the load at the front—then back up to discharge the material overhead into truck, or fill. That's all there is to it, and that's why MobiLoaders are winning so many friends, and boosting production on stockpile operations.

MobiLoaders are loading a wide variety of materials, such as clay, gravel, ore, crushed rock, coal, earth, etc. Different capacity buckets are available, depending upon the type of material to be handled.

The widely-used MobiLoader represents a smaller investment, too, than larger types of shovels, or loading equipment. In addition, the tractor is free to work elsewhere when you've finished your loading operations—it's not a "one-job" piece of equipment.

Why not write your Athey-"Caterpillar" Dealer, or Athey Truss Wheel Co., 5631 W. 65th Street, Chicago 38, Illinois for complete information on the MobiLoader? For certain types of work, a limited quantity of machines is now available for civilian use. Get More Facts.

A Model 8 MobiLoader, mounted on a "Caterpillar" Diesel D8 Tractor, loading material at an industrial plant.



Athey

MOBILOADERS

"CLEVELANDS"
Fast – Flexible – Rugged
MEET FULLY YOUR
DITCHING REQUIREMENTS
for - - - -

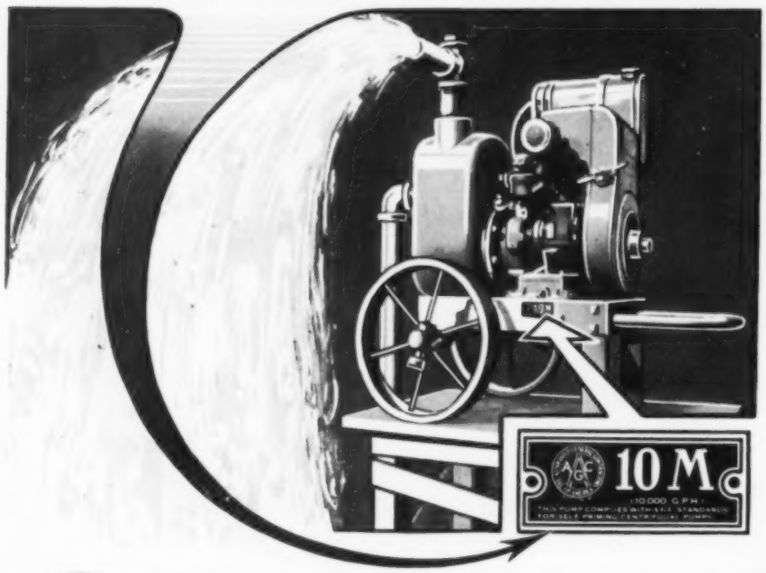
- - - Gas, Oil, Water Lines — Air Fields — Sewers — Drain Tile— Telephone and Telegraph Conduits and Building Foundations —

Finely balanced—correctly designed—powerful—rugged—fast—easily maneuverable on full crawler mounting—and strongly resistant to wear and abuse, "CLEVELANDS" represent the utmost in ditching economy and efficiency. That's why they are delivering Top Performance on many military projects and civilian jobs.

"CLEVELAND" Equipment includes: — Ditchers (Wheel and Ladder Type in several models) Side Boom Backfillers — Tampers — Pipe Cranes — etc.

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE "Pioneer of the Small Trencher" CLEVELAND 17, OHIO
"CLEVELANDS" Save More... Because they Do More

INSURED PERFORMANCE



When you buy a pump you want fast continuous pumping. Be sure the pump you buy carries the AGC rating plate. The plate is your insurance that the pump will deliver its full rated capacity.

CONTRACTORS PUMP BUREAU

BARNES MANUFACTURING CO. Mansfield, Ohio
CONSTRUCTION MACHINERY CO. Waterloo, Iowa
MARLOW PUMPS Ridgewood, N. J.
C. H. & E. MANUFACTURING CO. Milwaukee, Wis.
THE GORMAN-RUPP CO. Mansfield, Ohio
NOVO ENGINE CO. Lansing, Mich.
CHAIN BELT COMPANY Milwaukee, Wis.
JAEGER MACHINE CO. Columbus, Ohio
STERLING MACHINERY CORP. Kansas City, Mo.

Affiliated with
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.

COOLING SYSTEM—**Office of Defense Transportation,** 1147 New Post Office Bldg., Washington, D. C. (34-p. pamphlet) Gives information for operators of motor vehicles and any kind of equipment using liquid-cooled engines on cleaning, flushing, rust prevention, and anti-freeze. Seven sections give detailed recommendations on checks and tests for cooling liquid losses, routine maintenance of cooling system, finding causes of overheating and overcooling, causes of corrosion and prevention of rusting, factors leading to clogging of cooling system and ways to prevent it, and characteristics of different types of anti-freeze and their use. Section on anti-freeze tells in detail simple ways to test its strength and what should be done to obtain safest reuse. Copies are available from any district office of ODT Division of Motor Transport, or from regional offices of ODT Office of Information. It is latest in series on automotive maintenance prepared for ODT by Society of Automotive Engineers.

★ ★ ★

Equipment Companies Receive Army-Navy "E"

THIRD RENEWAL of its Army-Navy "E" was awarded to the Union Wire Rope Corp., of Kansas City, Mo. To Richard Kauzlaurich, machine operator went the honor of raising the "E" flag, since he topped the winners in 14 other departments with a work record of 10 hr. and 48 min. nightly since the first of the year. The third-time award went to employees and management of the plant for 18 mo. of production meeting "E" standards. In praising the plant's production record, Rear Admiral Alex M. Charlton, U.S.N. inspector of Navy materials, said the wire rope it had made for the Navy in recent months would stretch from the plant in Kansas City to Guadalcanal and extend on to Australia.

RECEIVING CONGRATULATIONS from REAR ADMIRAL ALEX M. CHARLTON for his record on production line as Machine Operator RICHARD KAUZLAURICH, who holds RICHARD, JR.

what light weight pipe means

to a "HEAVYWEIGHT" contractor

Wartime jobs have given many a contractor a new impression of ARMCO corrugated metal pipe for drainage: culverts, storm and sanitary sewers.

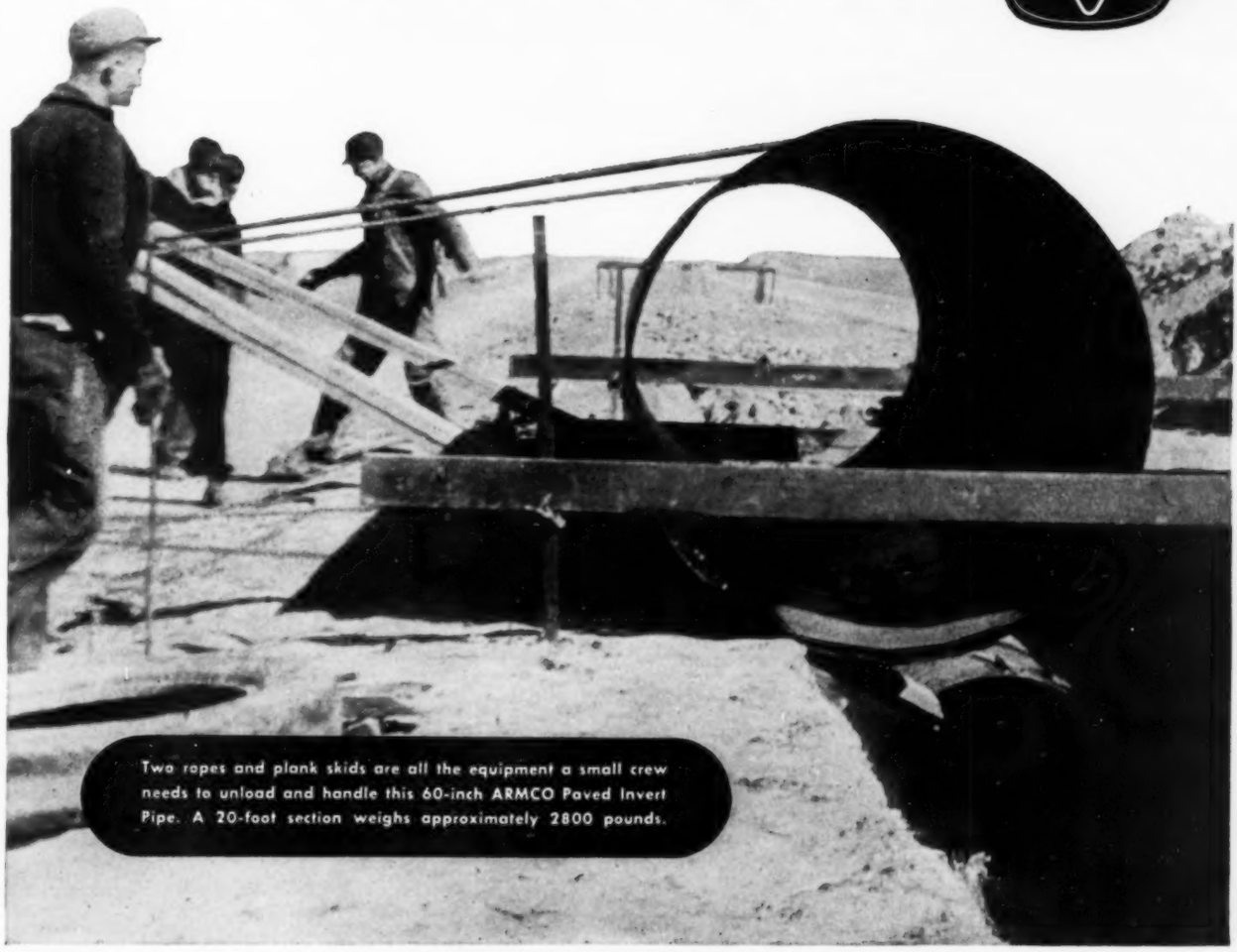
Although ARMCO corrugated metal pipe is light, it is exceptionally strong. Its longer lengths and fewer joints speed up work. Heavy handling equipment is not necessary.

Lighter weight also means fewer truck loads—only one-fifth to one-tenth as much as for other construction. Think of the savings in trucks, tires and men! You can afford to bid your drainage costs at a lower figure and yet make more profit.

Add to all this the "know-how" of ARMCO drainage engineers and you have a product and service that will help you finish your contracts ahead of schedule. Ask the ARMCO man to show you the convincing facts and figures in "Corrugated Metal Drainage Structures in the War Program." Armco Drainage Products Association, 65 Curtis St., Middletown, O.

ARMCO

ARMCO PAVED INVERT PIPE



Two ropes and plank skids are all the equipment a small crew needs to unload and handle this 60-inch ARMCO Paved Invert Pipe. A 20-foot section weighs approximately 2800 pounds.

SHORTENING THE VICTORY ROAD

In addition to their service on the fighting front with the army engineers, seabees and the RCAF, Insley Excavators are serving with equal efficiency and valor behind the lines, preparing vital supply and communications facilities under contract to many of the allied nations.

Such is the job Insley Excavators have done for Pan-American Airways . . . gouging airports out of the muck and mire and undergrowth of the jungle . . . working day and night in penetrating dust, steaming heat or freezing cold to provide the jumping off places for war-bound transports and bombers.

Here, as in the front lines, Insley's speed, stamina and ability to work efficiently in the tight spots have demonstrated their effectiveness as a force for shortening the Victory Road. And tomorrow—when they will again be available at home—Insley Excavators will prove to you their ability to save time and money on your jobs.

EXCAVATORS • CRANES • BUCKETS • CARTS

INSLEY

CONCRETE PLACING EQUIPMENT

INSLEY MANUFACTURING CORPORATION

INDIANAPOLIS 1, INDIANA

PRESENTED for "outstanding war production" to Ransome Machinery Co., of Dunellen, N. J., Army-Navy "E" pennant is displayed by (left to right) **LEONARD D'AMELIO**, veteran employee; **LIEUTENANT** (j.g.) **WILLIAM MURPHY, U.S.N.**; **L. R. WILSON**, company vice president; and **LIEUT.-COL. AUSTIN D. SMITH, U.S.A. Corps of Engineers.** Ransome concrete mixers are used throughout world in building air bases, gun implacements, and other important concrete construction at supply and fighting bases. Company's welding positioners are used at Navy shipyards and repair bases and its road pavers perform essential functions in construction of Army and Navy air base runways and hangar aprons, as well as access roads to war production plants.

★ ★ ★

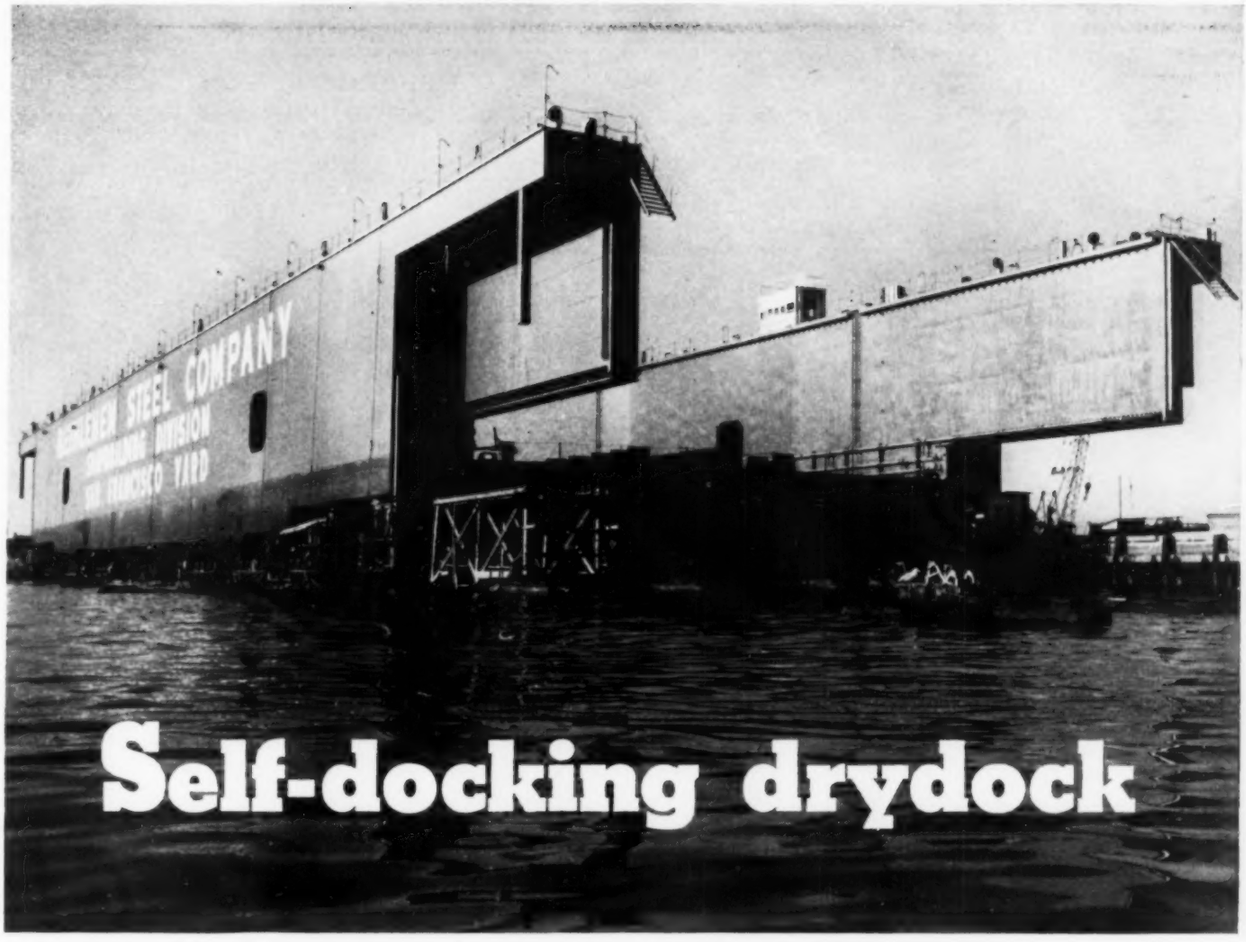
FIRST ARMY-NAVY "E" AWARD for the exclusive manufacture of pavers went to the Foote Co., Inc., of Nunda, N. Y., for its contribution to the war effort in building up and meeting the Engineer Corps requirements for road pavers. This company manufactures 27E and 34E concrete road pavers and Adnun pavers for black top roads.

★ ★ ★

Forty-One Pumps For "Little Inch" Pipeline

FORTY-ONE PUMPS for the War Emergency Pipeline project known as the 20-in. Products Line are being supplied by Ingersoll-Rand Co., of New York. Paralleling the 24-in. line known as "Big Inch," it will carry finished refinery products, such as gasoline and fuel oil, whereas the "Big Inch" will normally

(Continued on page 128)

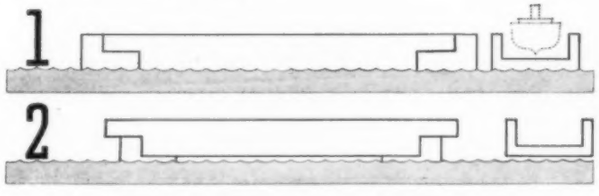


Self-docking drydock

The steel structure shown above at its erection site at Alameda, Calif., is a floating drydock which, like some huge porpoise, can lift itself clear of the water.

The drydock was fabricated and erected, and is owned, by Bethlehem Steel Company to service ships in the Pacific trade. It is capable of berthing the largest commercial vessels now plying the Pacific.

Self-Docking Features



Drawings show side view of the floating drydock (1) in working position, and (2) with the center section raised by the end sections. At right, end views of center section.

Designed by Rear Admiral (ret.) Frederic R. Harris, who has patented many of its features, the drydock is in three sections. The center section is designed to be raised out of the water for the purposes of removing barnacles. For this operation, the two movable end sections of the drydock are partially submerged, and moved under the center section, forming shelves on which it rests before raising. In similar manner, the end sections may be brought to rest on the center section, and then raised clear of the water. Thus the drydock is wholly "self-docking."

Launching—Local conditions suggested a method of launching which is believed to be unique. Instead of launching on shipways or in an artificial basin, it was decided to lower it into the water on sand jacks. Accordingly, falsework for construction was supported above the water on 20 jacking towers—clusters of four 28-in. jacks, 12 ft., 6 in. high. The launching date was chosen with regard to tide conditions, and the drydock, drawing 5 ft., 6 in., was lowered 9 ft., finally floating in 7 ft., 9 in. of water at high tide.

★ ★ BETHLEHEM STEEL ★ ★

C-22C

This spring-cushioned towing eye is just one of several Le Roi features which enable you to get air for a job in a hurry, with minimum time lost on and between jobs. Truck-type springs — retractable caster wheel — quick starting at the press of a button — all help your record for fast performance. Ask your Le Roi dealer about maintenance service—also about new Le Roi compressors available with adequate priorities.

Le Roi Company
1712 SOUTH 68th STREET • MILWAUKEE 14, WISCONSIN
LE ROI

Alert Contractors!
Buy the
JACKSON
Hydraulic
Concrete
Vibrator
for Dependable, Speedy Performance

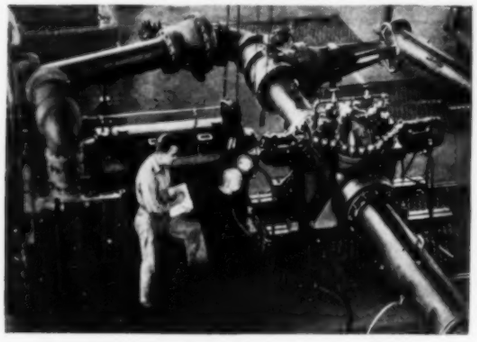
- Automatic pressure lubrication—requires no attention.
- 34-ft. hose—2¾" vibrator head.
- Adjustable frequency to 6800 R.P.M.—submerged in concrete.
- Powerful gas engine—4.7 H.P.
- Long-lived, ball-bearing, rotary, hydraulic pump.

THEY CAN "TAKE IT"
24 HOURS A DAY
7 DAYS A WEEK

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

(Continued from page 126)

carry crude oil. The pumps, which were specially designed for this job, are single-stage, centrifugal units. Since it was specified that no critical materials should be embodied in the pumps, all major castings are of high-grade cast iron. Each pump is driven by a 3,570-rpm., 1,500-hp. electric motor and operates against a total head of 825 ft. Three such ma-



"LITTLE INCH" PIPELINE PUMP is inspected on test bed at manufacturers' works.

chines in each pumping station will operate in series to produce a final line pressure of 800 lb. per sq. in. This pressure is gradually reduced by friction between stations until the suction pressure at the succeeding station is about 30 lb. per sq. in. The pumps are so designed that two may operate in series or one may operate alone if such an arrangement is desired.

★ ★ ★

Training for Army Engineers

(Continued from page 65)

laid and supplied nearly 6,000,000 gal. of water per day. Portable water-purification units were also sent by the Engineers to Weber Falls and Gore River, Okla., to take care of water supply failure. A chlorinator at the Muskogee Army Air Base was dismantled and used in furnishing a measure of temporary relief when the water supply in Muskogee failed.

Engaged in fighting the floods were

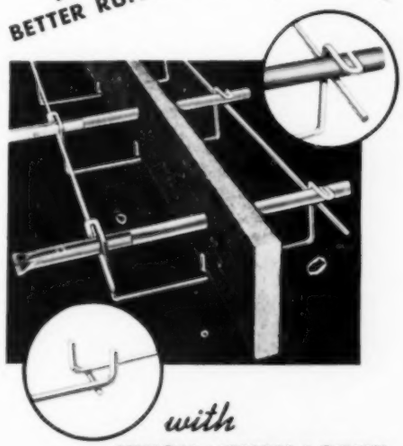
WATER IS CARRIED from purification units which were rushed to flood districts of Arkansas to insure adequate supply for troops engaged in flood control work and to supplement civilian supply when damage occurred to community systems.

four regiments, including the 95th Engineers, a colored unit just back from the Alaska Highway, as well as numerous auxiliary battalions and companies. The Engineer Corps had the cooperation of the

(Continued on page 130)

Takes Less Time

TO BUILD BETTER RUNWAYS



with

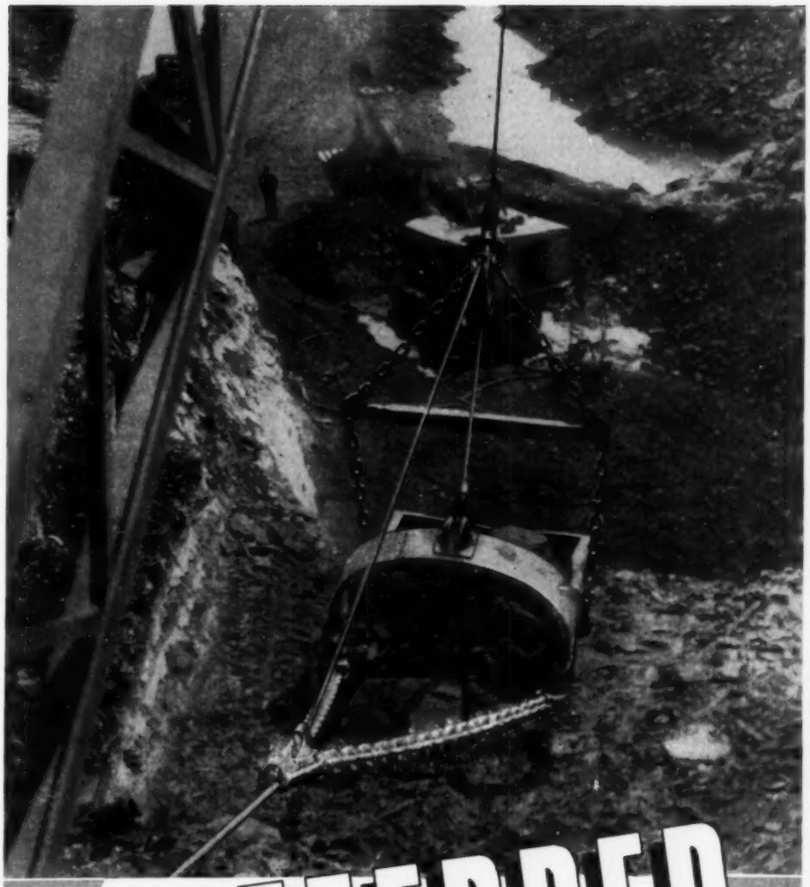
UNION "QWIK-LOCK"

Union "Qwik-Lock" Airplane Runway Expansion Joint Assemblies speed up construction. They simplify installation of dowels and joint material and accurate, locking and alignment of dowels. They are designed for fool-proof, trouble-free functioning.

Write for Catalog of Construction Accessories.

UNION STEEL PRODUCTS COMPANY
439 Pine St., Albion, Michigan

SEE OUR CATALOG IN SWEET'S



PREFERRED BY COAL STRIPPERS

Why? Because Page AUTOMATIC Dragline Buckets dig—through soapstone, shale and blasted rock. They DIG—and yet they clean off the coal without tearing it up, the AUTOMATIC Digging Action—plus—Page CONTROL.

Write for details without obligation

Page *Automatic* **DRAGLINE BUCKETS**

PAGE ENGINEERING COMPANY
c/o Clearing Post Office, Chicago, Illinois

ON ROGERS TRAILERS

GETTING there "fustest with the mostest" as one early American General aptly phrased it, is battle strategy that really conquers!

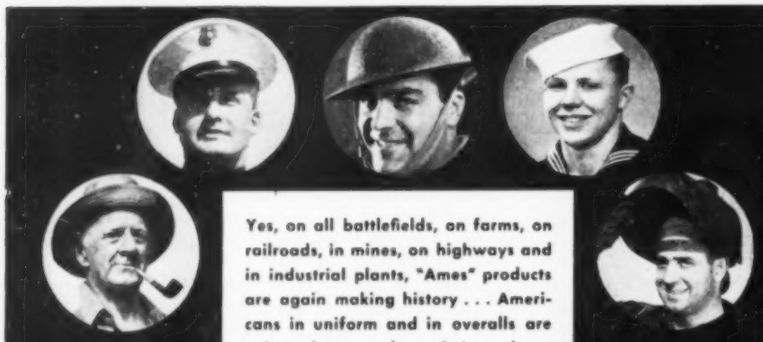
In the lightning speed of mechanized warfare tanks ride "Pick-A-Back" to battle on ROGERS TRAILERS so their fighting capacity is unimpaired. Special ROGERS TRAILERS retrieve disabled tanks so they can be repaired and rushed into battle again.

ROGERS TRAILERS are doing a real war job at home and abroad. New models which will be available to industry when war contracts are completed will be even better-engineered and more efficient than their predecessors.

EXPERIENCE *builds 'em* PERFORMANCE *sells 'em*

ROGERS BROS. CORPORATION
ALBION, PENNA.

"AMES" TOOLS LEAD TO VICTORY



Yes, on all battlefields, on farms, on railroads, in mines, on highways and in industrial plants, "Ames" products are again making history . . . Americans in uniform and in overalls are using these tools to bring about a speedy and complete victory . . . Everywhere "Ames" Brand names are as familiar as the names of home towns! Today, as in 1774, when Americans require shovels, they insist on "Ames".

COLT
PONY
HUSKY
O. AMES
OPTIMUS
PEERLESS
FAVORITE
TWO STAR

RAM
CARTER
BRONCO
KNOXALL
RED EDGE
PINNACLE
THREE STAR
MONONGAH

AMES Since 1774

AMES BALDWIN WYOMING CO.
PARKERSBURG, W. VA. NORTH EASTON, MASS.
Shovels . . Spades . . Scoops . . Forks . . Hoes . . Rakes

(Continued from page 129)

Army Service Forces, through the Service Commands, the Coast Guard, the Air Forces, the Army Ground Forces, the Weather Bureau, the Red Cross, and other national, state, and local agencies.

★ ★ ★

Anderson Ranch Dam

(Continued from page 55)

seventh belt, 125 ft. long, discharges from a 100-ft. cantilever span into a rail-lined chute which leads directly to Belt No. 8, 200 ft. long and carried over two trusses which permit continuance of operations in the dam excavation without delay to the belt system's operation. From Belt No. 8, the clay is dumped down a 240-ft. chute at an angle of 51 deg. to Belt No. 9. This final flight is 150 ft. long and mounted on tracks at a point 100 ft. from the tail so that it can spread the clay in a circle over the places where it is needed or in piles for trucks and carryalls to distribute still farther over the dam-core site.

After the clay is dumped by the belts, it is spread in 6-in. layers and tamped with sheepsfoot rollers drawn by diesel tractors. The balance of the earth for the dam, which will be packed on both sides of the core, will be drawn from two other pits. The upstream side of the dam will be reinforced with heavy stones for its full height, while the core will be keyed into the foundation with two perpendicular concrete walls around which the impervious material is placed.

★ ★ ★

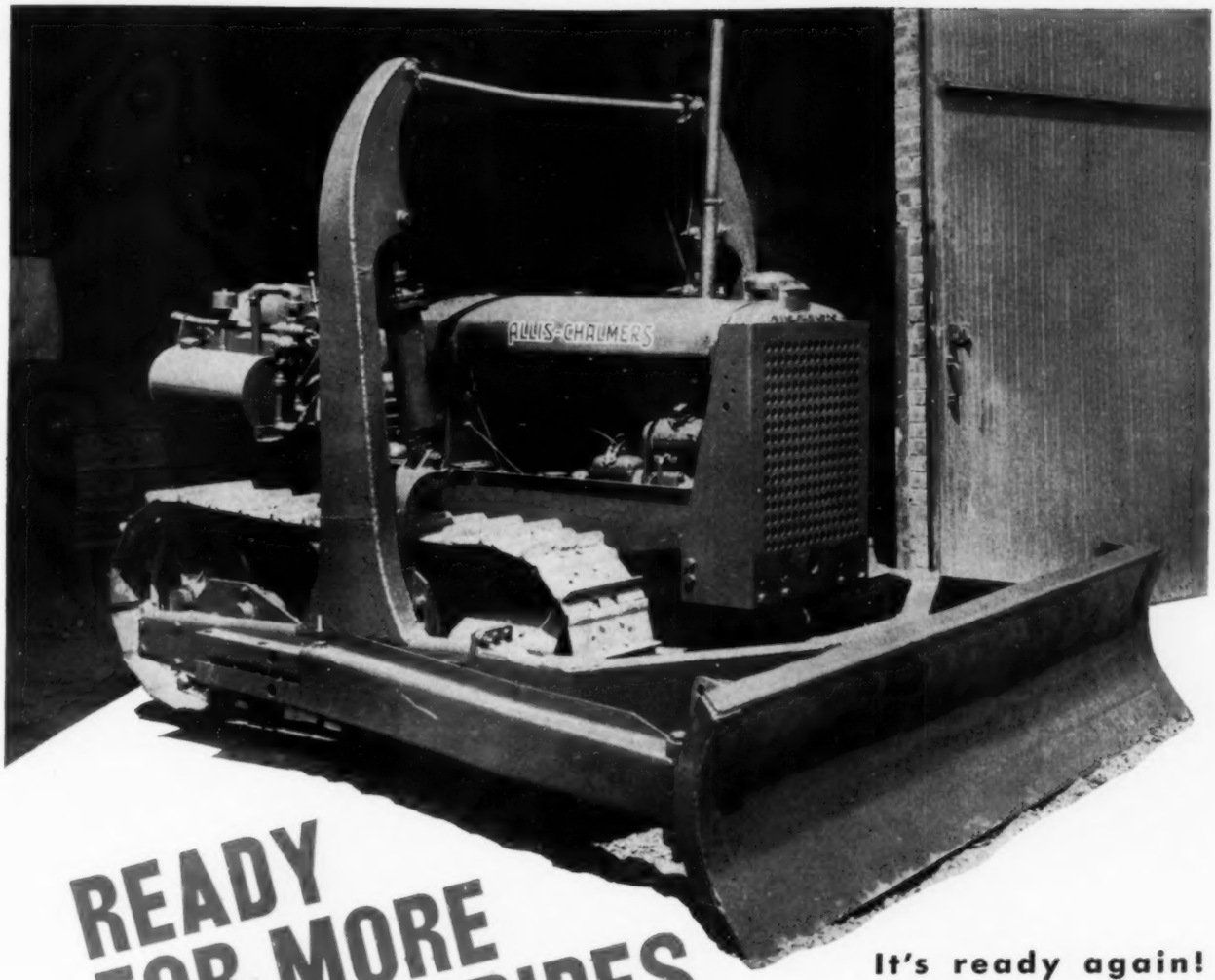
Merry-Go-Round Machine

(Continued from page 61)

tainly will be severe. In tanks designed to hold oil or other non-aqueous liquids, shrinkage must be expected and taken into consideration in the design.

Prestressing a cylindrical concrete tank during construction with steel bands around the walls puts the concrete into compression. As shrinkage and plastic flow occur in the concrete, there is a concurrent reduction in the tensile stress of

(Continued on page 132)

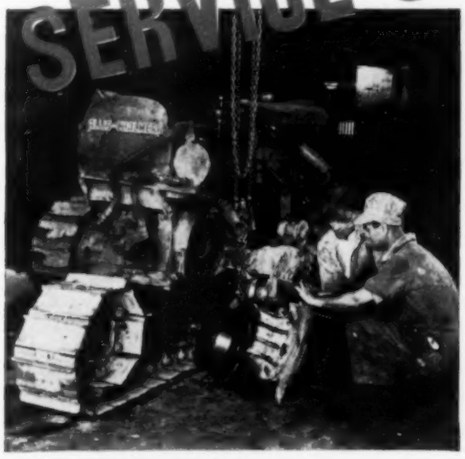


READY FOR MORE SERVICE STRIPES

It's ready again! After thousands of hours of tough service, this Allis-Chalmers Model WM tractor is ready for more service stripes . . . ready to take what comes for additional years. Owned by contractor H. L. Coble, Greensboro, North Carolina, it returns with stepped-up efficiency to its work on a nearby Army Air Base.

The overhaul included repairing of the final drive, installation of new track rollers and adjustments on right hand track. Yet the job took only three days—which included a one day wait for certain critical parts . . . fast service, considering present conditions and the shortage of vital materials and labor. But E. F. Craven Company, Greensboro, N. C., who handled the job, like other Allis-Chalmers dealers, is equipped to render good service in these difficult times.

Why not get new machine performance by rebuilding *your* worn equipment! Entrust the job to your Allis-Chalmers dealer and rest assured the work will be handled right and with all possible speed. At all times he has done his best to serve you . . . even under wartime conditions he is doing a *mighty fine job.* See him . . . today!



MEN WHO KNOW "what's what" *about machines handle your repairs in Allis-Chalmers shops. Here, two of E. F. Craven's crew apply their skill on overhauling the final drive of the Model WM owned by contractor H. L. Coble, Greensboro, North Carolina.*

ARMY NAVY

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE • U. S. A.

Here Is Your Nearest Worthington Distributor

For Sales, Rentals and Service on BLUE BRUTE Portable Compressors, Rock Drills and Air Tools.

See full page ad Back Cover

ALABAMA
Birmingham—Tractor & Equipment Co.
ARIZONA
Phoenix — Smith Booth Usher Company
ARKANSAS—Fort Smith — R. A. Young & Son
Little Rock — R. A. Young & Son
CALIFORNIA
Los Angeles — Smith Booth Usher Company
San Francisco—Edward F. Hale Company
COLORADO
Boulder — Standard Machine Works
CONNECTICUT
Hartford — The Holmes-Talcott Company
GEORGIA
Atlanta — Tractor & Machinery Co., Inc.
ILLINOIS — Chicago— Kennedy-Cochran Co.
Rockford—H. B. Faith Equipment Co.
INDIANA
Indianapolis — Reid-Holcomb Company
IOWA— Des Moines — Electrical Eng. & Constr. Co.
Davenport — Industrial Engineering Equipment Co.
KENTUCKY — Harlan — Hall Equipment Sales
Louisville— Williams Tractor Company
LOUISIANA
New Orleans — Wm. F. Surgi Equipment Company
MAINE — Ellsworth — Murray Machinery Co.
MARYLAND
Baltimore — D. C. Elphinstone, Inc.
MASSACHUSETTS
Boston — P. I. Perkins Company
Cambridge — W. W. Field & Son, Inc.
Springfield — The Holmes-Talcott Company
MICHIGAN
Detroit — W. H. Anderson Company, Inc.
MINNESOTA
Hibbing—Arrowhead Equipment & Supply Co
Minneapolis — The George T. Ryan Company
MISSOURI
Kansas City — Machinery & Supplies Company
St. Louis — Ryan Equipment Co.
MONTANA— Helena — Caird Engineering Works
NEW HAMPSHIRE
West Lebanon—P. I. Perkins Company
NEW JERSEY
Hillside—P. A. Drobach
North Bergen—American Air Compressor Corp
NEW MEXICO
Albuquerque — The Harry Cornelius Company
NEW YORK
Albany — Larkin Equipment Company
Albany—T. Southworth Tractor & Machy. Co., Inc.
Menands
Binghamton — MacDougall Equipment Co.
Buffalo — Dow & Company, Inc.
Corona, L. I. — The Jaeger-Lembo Machine Corp.
Middleton — S. T. Randall, Inc.
New York—Hubbard & Floyd, Inc.
Olean — Freeborn Equipment Company
Oneonta — L. P. Butts, Inc.
Syracuse — Harrod Equipment Company
NORTH CAROLINA
Durham — Constructors Supply Company, Inc.
OHIO — Cincinnati — The Finn Equipment Company
Cleveland — Gibson-Stewart Company
Marietta — Northwest Supply & Equipment Co.
Toledo — M. W. Kilcorse & Company
OKLAHOMA
Oklahoma City — Townsco Equipment Co.
OREGON
Portland — Andrews Equipment Service
PENNSYLVANIA
Easton — Sears & Bowers
Harrisburg — N. A. Coulter
Oil City — Freeborn Equipment Company
Philadelphia — Metalweld, Inc.
Pittsburgh — John McC. Latimer Company
Wilkes-Barre — Ensminger & Company
SOUTH CAROLINA
Columbia — Bell-Lott Road Machinery Co.
SOUTH DAKOTA
Sioux Falls — Empire Equipment Co.
TENNESSEE
Chattanooga — James Supply Company
Knoxville—Wilson-Wessner-Wilkinson Co.
Memphis — Tri-State Equipment Company
TEXAS—Dallas—Shaw Equipment Company
El Paso—Equipment Supply Co.
Houston—Dye Welding Supply Co.
San Antonio — Patten Machinery Company
UTAH — Salt Lake City — The Lang Co.
VIRGINIA
Richmond — Highway Machinery & Supply Co.
WASHINGTON
Seattle — Star Machinery Company
Spokane—Andrews Equipment Service
WEST VIRGINIA
Fairmont — Interstate Engineers & Constructors
WISCONSIN
Eau Claire — Bradford Machinery Company
Green Bay — Nelson Machinery Company
Madison — Western Equipment Company
WYOMING
Cheyenne — Wilson Equipment & Supply Co.

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

Worthington Pump and Machinery Corp.

(Contined from page 130)

the steel bands and in the counteracting compressive stress of the concrete. When the empty tank is filled, the load of the liquid increases the tension in the wire bands and reduces the compression in the concrete. To avoid introducing any tension into the concrete, the compressive stress remaining under the preceding condition after loss in steel stress caused by shrinkage and "creep" of the concrete must be at least equal to the counter-stress imposed by the liquid load. With low-stressed steel rods, it is not always possible to attain this result. Walls of tanks prestressed with rods have been known to crack when the empty tanks were refilled. Because of its high yield point, steel wire can be given an initial stress which will result in keeping the concrete in compression when a tank is refilled even after shrinkage and plastic flow have occurred in the concrete walls.

Turnbuckle rods of the type formerly used on prestressed concrete tanks have a yield point of about 60,000 psi. and cannot be practically or economically stressed above 40,000 to 45,000 psi. Shrinkage and plastic flow in concrete tanks exposed above the surface of the ground commonly cause a decrease in steel elongation equivalent to a stress reduction of 30,000 psi. or more. With so much of the initial stress lost by reason of the shrinkage and plastic flow of the concrete, the stress remaining in the steel rods may not be much in excess of 10,000 psi., and a large number of rods therefore is required to take the full working load imposed by filling the tank.

In place of the steel rods, an ordinary commercial grade of cold-drawn wire having a yield point of about 185,000 psi. and an ultimate strength up to about 220,000 psi. makes possible a great reduction in the quantity of steel required and gains certain other advantages already enumerated. For tanks so far constructed with prestressed wire, the initial stress put into the wire has been about 150,000 psi. (the value used for the two Curtiss-Wright tanks), permitting a working stress of 105,000 or 110,000 psi. even after a loss of 45,000 or 40,000 psi. through shrinkage and plastic flow in the concrete. An excess, or reserve, prestress of about 45,000 psi. is believed to be ample to offset all losses due to shrinkage, plastic flow and temperature.

Tank Walls

With a reinforcement of wire bands prestressed to a value which assures their functioning effectively under all conditions of tank use, the walls of a tank have only two purposes: (1) to form a liquid-tight container, and (2) to provide a

HAISS

BIGGER PAYLOAD BUCKETS

For TRENCHING ...the Narrow-bowl HI-POWER in ½ and ¾ yd. sizes is a master workman.

For EXCAVATING ...a full line of HI-POWER Buckets with variable reeving for up to 7:1 closing ratio.

For REHANDLING ...the Haiss MULTI-SHEAVE in a full range of sizes. Fast, sturdy and long lived.

Haiss has the right bucket for your particular job, engineered all the way to give you bigger pay-loads through improved design and construction. A Haiss Bucket gives your crane a chance to break its own best performance records. Every Haiss Clamshell is built to do its particular type of work better. Fifty years of skill and experience in manufacture back it up.

★ *Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.*

GEORGE HAISS MANUFACTURING CO., INC.

140th St. and Rider Ave., New York 51, N. Y.

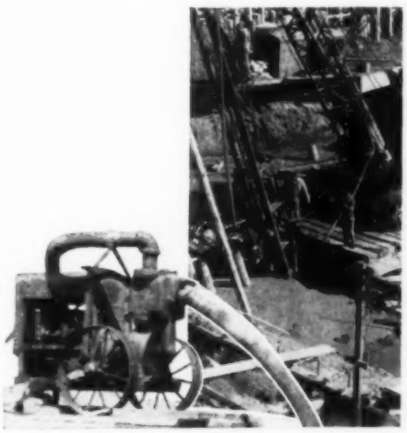
cylinder of sufficient strength to take a wrapping of stressed wire. A 4-in. wall of pneumatically applied concrete, reinforced with prestressed vertical rods to prevent horizontal cracks, is adequate for the two purposes in tanks of a capacity up to 500,000 gal. Walls of the two tanks at the Curtiss-Wright plant are both 4 in. thick at the top, increasing to a thickness of 5 in. at the base of the 400,000-gal. tank and 6 in. at the base of the 500,000-gal. tank. Both tanks are 65 ft. in diameter, with respective heights of 16½ and 20¼ ft.

After the wire bands have been applied to a tank, they are protected by a permanent cover of pneumatically applied mortar or concrete about ¾ in. thick which serves also to bond the bands and concrete shell together. Where more than one layer of wire bands is required, each layer is shot with mortar before the succeeding layer of wire is applied.

Wire Firmly Bonded

Questions arise as to what would happen to an embedded wire if it should break. It can be said that, even if a wire

(Continued on page 134)



When There's No Time for Breakdowns It's Time to Get a Gorman-Rupp Pump

Today, when time is the essence, you need a Gorman-Rupp Self-Priming Centrifugal Pump more than ever. There is not a quitter among them. The water passage has the same area as the suction hose. Muck, gravel, cinders — you simply can't clog them because solids cannot accumulate. There is no recirculation orifice to clog — no shut-off valve to jam — no hand priming regulator. There isn't a self-priming centrifugal pump made that will outwork a Gorman-Rupp in gallonage or continuous hours. Gas engine or electric motor driven. Capacities up to 125,000 GPH. There is a type and style to fit your every requirement. Stock for immediate delivery in 100 principal cities.

THE GORMAN-RUPP COMPANY, MANSFIELD, OHIO

GORMAN-RUPP
Self-Priming Centrifugal Pumps

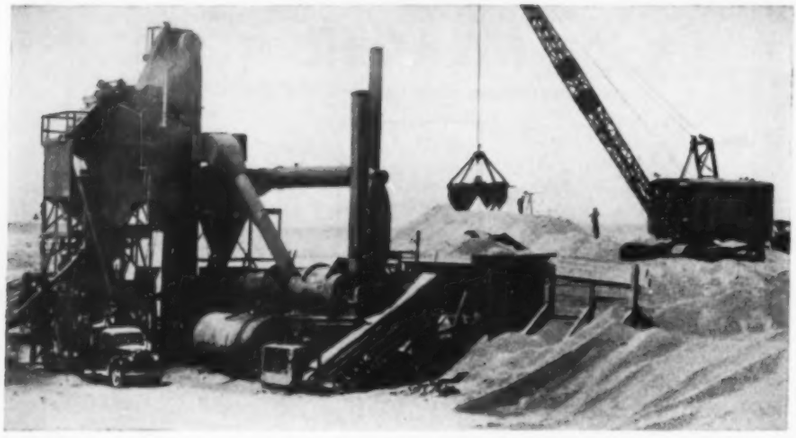
MERCER
"The Name that Carries Weight"

EQUIPMENT
for the
HANDLING
of
CONSTRUCTION
MATERIALS

Cranes, Elevators, Lift & Trailer Trucks, Conveyors, Live Skids, Drum Hoists, Winches, Tool Wagons, Carts.

WRITE FOR DETAILS
MERCER-ROBINSON COMPANY
INC.
30 CHURCH ST. • NEW YORK 7, N. Y.

THIS H&B PLANT AVERAGED



OVER 100 TONS of ASPHALT Per Hour

In spite of dust storms which necessitated frequent shut downs, this H & B asphalt plant did a real job for its owner, S. Birch & Sons Construction Co., of Great Falls, Montana, on a big northwestern air base project. For one five-day period the average hourly asphalt production was 115 tons.

This production is typical of the way in which H & B plants are helping speed the construction and maintenance of roads and bases that are vital to victory. Literature describing the complete line of H & B portable and stationary asphalt plants will be sent on request.

HETHERINGTON & BERNER Inc. • Indianapolis 7, Indiana

Hetherington & Berner

VALVE SEAT INSERTS
Can be taken for granted on
ALL
WISCONSIN
HEAVY-DUTY
Air-Cooled ENGINES

Model VE-4, 22 hp., 4 cyl., V-type Engines. Other types and sizes, 1 and 4 cyl., 1 to 31 hp.

To provide the most satisfactory heavy-duty service and to reduce replacement costs to a minimum, ALL Wisconsin Engines are made with renewable valve seat inserts, made of costly chrome-nickel molybdenum alloy. You have less valve grinding to do, fewer tappet adjustments to make... and a simple replacement job. One of many "better-than-average" details of Wisconsin Engine construction that help to maintain trouble-free service schedules for Wisconsin-powered equipment.

MOST POWER Per POUND

WISCONSIN MOTOR Corporation
MILWAUKEE, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

(Continued from page 133)

should be severed, it would not slip. Numerous tests have shown that highly stressed wire of the diameters being used is self-anchoring when covered with a dense coating of pneumatically applied mortar. Stressing of the wire reduces its diameter slightly. If the wire is cut, it tends instantly to resume its original diameter, and this increase serves as a plug to localize the effect of the break and prevent the stress from being decreased beyond a point 2 or 3 in. from the break.

Accompanying photographs show the anchor bolts which are used to anchor the wire every 12 or 15 strands and the "torpedo" splice employed to join successive lengths of wire in winding a continuous spiral around a tank.

Steel Quantities Required

For the two tanks at the Curtiss-Wright plant, total steel requirements, including 5,000 lb. of steel wire, amounted to 28,500 lb. The 23,500 lb. of steel for other purposes was distributed as follows: vertical prestressed rods to resist horizontal cracks in walls, 10,500 lb.; dowels between floor and walls, 3,000 lb.; wire mesh in floors and dome roofs, 10,000 lb. Conventional reinforced-concrete design would have required about ten times as much steel for two tanks of the same size.

These two tanks, of 900,000-bbl. total capacity, took 18 mi. of wire. For an average 1,000,000-gal. tank, prestressing requires about 22½ mi. (6,000 lb.) of wire which, at an average rate of 2 mph., can be wound in two days.

By comparison, if the same 1,000,000-gal. tank were to be prestressed with rods, 27,000 lb. of rods would be required, and the time consumed in placement would be about 7 days. Thus there is a saving of 10 tons of steel and 5 working days during construction, and the wire-banded tank represents a better design.

Personnel

Designs and methods for prestressing with wire have been developed by the Preload Co. under the leadership of J. M. Crom, vice president and chief engineer. The prestressed concrete tanks at the Curtiss-Wright plant were constructed by the Preload Co. for Albert Kahn Associated Architects & Engineers, Inc., and Darin & Armstrong, Inc., general contractor, Detroit. Construction was financed and supervised by the Defense Plant Corp. For the Preload Co., John Ritter was superintendent in charge of the job, and Homer Gafford, wire-stressing supervisor, directed the application of stressed wire to the tanks. George H. Starr is general superintendent for the company.

They used to churn butter by hand!

But today most of it is churned in mechanically revolved "barrels," with manual operations reduced to a minimum. A more uniform and sanitary product has resulted with obvious savings in man hours. MEVAC metered vacuum power control of all operations on the Buckeye Clipper outmodes tiresome tugging and pushing of levers in shovel operation.

Most Buckeye Clippers are "in uniform"—those built before the war and owned by contractors, mines, quarries, clay pits and industrial plants are almost 100% in war work and all those built since the war have been requisitioned by Uncle Sam for use by our fighting forces, at home and abroad.

When Buckeye Clipper convertible shovels with their vacuum power control get back into "civies" they can materially lower your excavating and material handling costs, at the same time increasing your daily yardages. The way they are performing today, under severe handicaps, in all kinds of climates from 120° in the shade to 30° below zero, often at the hands of green operators and frequently enduring long periods without maintenance are indications of what they can do for you.

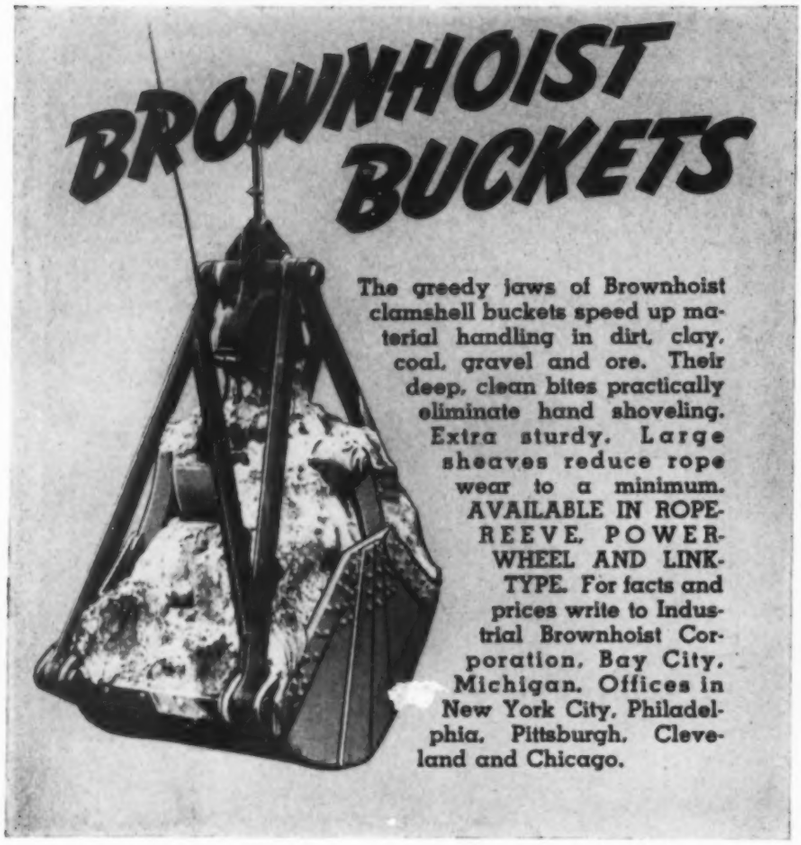
Look ahead—send for Buckeye Clipper Bulletin 543 which takes the Clipper apart and shows you step by step why it will be the outstanding buy among 1/2 and 3/4 yd. shovels.

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

50 YEARS OF PROGRESS BUCKEYE 1893 1943

Buckeye

CONVERTIBLE SHOVELS, TRENCHERS AND BACKFILLERS, TRACTOR EQUIPMENT, R-B FINEGRADERS, ROAD WIDENERS AND SPREADERS


BROWNHOIST
BUCKETS
The greedy jaws of Brownhoist clamshell buckets speed up material handling in dirt, clay, coal, gravel and ore. Their deep, clean bites practically eliminate hand shoveling. Extra sturdy. Large sheaves reduce rope wear to a minimum. AVAILABLE IN ROPE-REEVE, POWER-WHEEL AND LINK-TYPE. For facts and prices write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.

Reliance

Offers Post-War Service

Reliance Products

Rock Crushers, Bucket Elevators, Revolving Screens, Storage Bins, Pulverizers, Chip Spreaders, Heating Kettles, Bin Gates, Feeders, Belt Conveyors, Grizzlies, Air Separators, Sand and Gravel Spreaders, Wash Boxes.

How you are to be equipped for Post-War work, is a major concern to us right NOW. We offer you our facilities for your Post-War planning.

Advise us, then, if you will, what your requirements are likely to be in the period following the peace. For instance:

(1) What you are possibly going to need in Crushers, Screening and Conveying equipment, portable or permanent.

(2) Write us what improvements you would like to see made in equipment to meet your Post-War needs.

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y., U. S. A.
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U. S. A.

Traveling Scaffolds Erect Blimp Hangars

(Continued from page 58)

cated on the layout tables, but shear plates were substituted in splices to facilitate making connections in the air.

Fabricated truss sections picked up by crawler cranes from the assembly frames were set and guyed on special steel-frame, flange-wheel trucks to be rolled forward on railroad track into position to be raised by the stiff-leg derricks on the traveling scaffold. Special bridles, hung from the hoist lines of these rigs, picked up the truss sections at the proper angle for erection. The haunch section, erected on a reinforced-concrete bent, was about 56 ft. long and weighed 6 tons; the intermediate section, 45 ft. long (panel points 6 to 10), weighed 1½ tons; and the top section, 84 ft. in length, weighed 4 tons. Total weight of a complete timber arch truss was 19 tons. Timber roof purlins and timber struts and cross-bracing between arch trusses were erected with the aid of the derricks on the traveler before the big jumbo moved to its next position.

Railroad cars carrying the steel-frame scaffold moved on seven lines of track. To roll the jumbo forward a crawler crane was attached to it by wire-rope pulling cables. The crane moved it 20 ft. to its next position in less than 30 min.

Progress

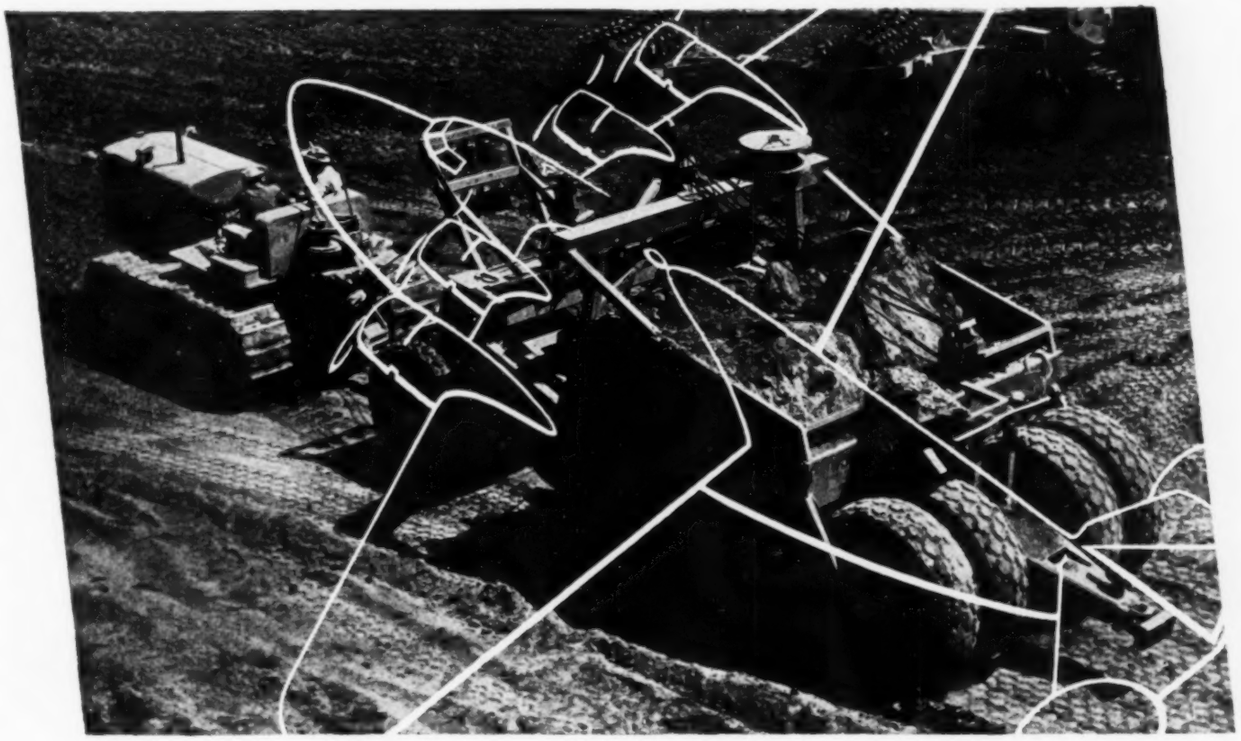
Erection of the first truss was started April 9, and the fifty-first and final truss was completed June 2, at 12:00 noon. During this period of 54 calendar days, 17 days were lost because of adverse weather conditions, leaving 37 days in which truss erection crews could work. When not stopped by weather, their working schedule called for a 10-hr. day, 7 days a week.

Roof sheathing of 2-in. lumber, laid horizontally on rafters supported by the purlins, was placed on ten bays at a time, working up from the concrete bents and down from the crown on both sides. At no time was roof sheathing more than six bays behind the point of erection of trusses.

Timber box girders supported between hollow concrete door-pocket towers at the two ends of the hangar were a sepa-

(Continued on page 138)

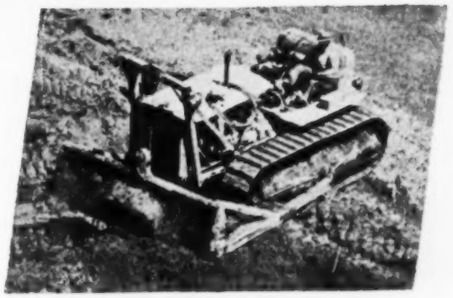
WOOLDRIDGE TERRA CLIPPER SCRAPERS



MOVE WORLDS OF EARTH

IN LESS TIME — AT A LOWER COST

Backed by a world of job-proven performance, Wooldridge huge-capacity Terra-Clipper Scrapers operating on the Boiling-Bowl principle move worlds of earth faster, cheaper and easier. They are designed and built from the ground up with proper load balance and super-dreadnought construction to withstand greater abuse over longer periods of constant use--with less wear and tear--less down-time for repair. Faster loading and dumping of larger heaping loads enables them to make more trips per shift--moving greater yardages in less time--with less trouble--at a lower yardage cost. Put Wooldridge Scrapers on every job and compare the contrast in yardages, time and cost.



Wooldridge Bulldozers are also built first—to outlast.

•

WOOLDRIDGE SCRAPERS ARE SUPPLIED TO THE U. S. GOVERNMENT FOR 2-LINE OPERATION, PERMITTING THE USE OF 2-DRUM POWER UNITS

WOOLDRIDGE

MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

BOILING BOWL TERRA CLIPPER PRINCIPLE SCRAPERS

NOW *you can get 10 basic books of*

DAY-IN-DAY-OUT VALUE TO THE CIVIL ENGINEER

in one handy volume that—

. . . answers your questions in *any* division of civil engineering;

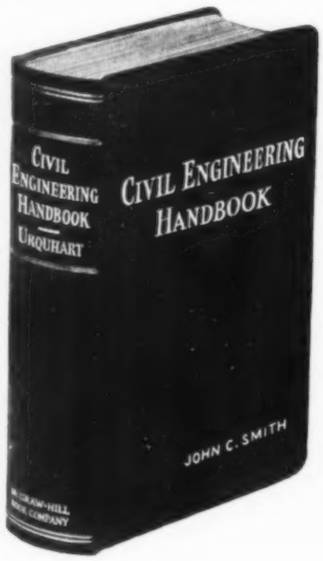
. . . blends theory, practice and fundamentals equally;

. . . is comprehensive, up-to-date and authoritative;

. . . is reasonably priced.

CIVIL ENGINEERING HANDBOOK

Editor-in-chief: Leonard C. Urquhart, Professor of Structural Engineering, Cornell University. Second Edition, 870 pages, 6 x 9, over 900 illustrations and diagrams $5.00



HERE are the fundamentals of the various subdivisions of civil engineering for men who actually plan, select, design, and construct civil engineering structures and projects. In each division a noteworthy specialist has contributed a compact treatise, developing fundamental theories as well as stating more involved ones, making the book not only a comprehensive reference work of modern civil engineering practice, but also adaptable for systematic study of any of the fields represented in it.

In this edition you will find surveying practice carefully defined; developments in highway and railroad work thoroughly covered; specialized data on design and construction of framed structures; new specifications for concrete and steel design to conform to approved specifications; important data on foundations, sewerage and water supply.

Here in one handy volume is the practical information you need on: —

—Stadia surveying
—Land surveying
—Topographic mapping
—Hydrographic surveying
—Railway turnouts, connecting tracks and crossings
—Widening, spiraling and banking of highway pavements;
—Highway administration and finance;
—Highway materials and tests;
—Construction costs of roads and pavements
Mechanics of Materials
—Fluid pressure
—Pipes and open channels
—Flow of viscous fluids
—Measurement of flowing water
—Roof trusses
—Dead-load stresses in bridge trusses
—Lateral forces on bridge trusses
—Arches
—Slope-deflection
—Moment distribution
—Riveting and welding
—Bearing plates and grillage beams
—Bridges
—Mill Buildings
—Multi-story buildings
—Design of concrete mixtures
—Mixers and mixing
—Buildings and walls, footings and foundations
—Concrete arches
—Box culverts and rectangular frames
—Properties of soils
—Mechanics of soil resistance
—Caissons
—Underpinning
Sewerage and Sewage Disposal
—Intakes and dams
—Ground water
—Aqueducts and pipe lines
—Pumps and motors
—Quality of water
—Water purification

Add it to your library

Everything about this handbook points to its usability: its large page size, large illustrations and type size; its many illustrative problems; and the comprehensive selection of reference tables and formulas to augment the text matter. You can use it to check your methods, keep abreast of the field, and solve many specific problems of practice. See it—add it to your library today—as a needed, and valuable engineering tool.

SEE IT 10 DAYS — *Mail the Coupon*

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.
Send me Urquhart—Civil Engineering Handbook, 2nd Edition, for 10 days' examination on approval. In 10 days I will send $5.00, plus few cents postage, or return book postpaid. (We pay postage on orders accompanied by remittance.)

Name .....
Address .....
City and State .....
Position .....
Company .....CM. 1-44

(Continued from page 136)

rate erection problem. These girders, which serve as overhead guides for six-leaf segmental sliding doors, have a vertical clearance of 120 ft. and a span of 220 ft. between the towers, with cantilever ends extending beyond the towers. They weigh 330 tons each. To support each box girder during erection in the 220-ft. span between towers, a temporary steel-frame bay, not supported by railroad cars, was added to the traveler scaffold when it was at each of the two door positions. Cantilever extensions of the box girders, weighing 37 tons each, were assembled on the ground and were raised by a guy derrick resting on the concrete towers.

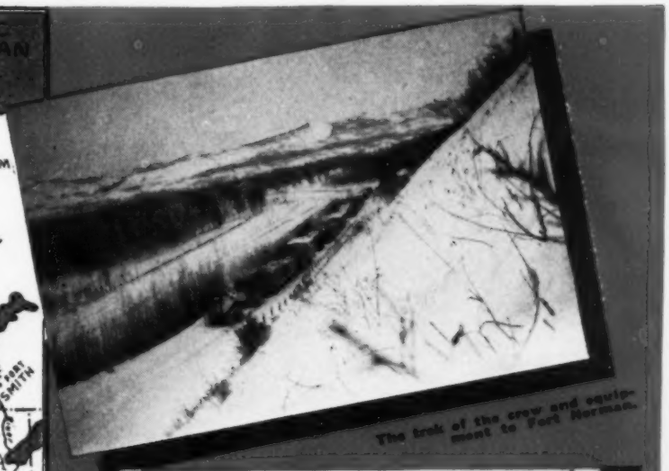
Direction

For the Bureau of Yards and Docks of the Navy Department, which designed the hangars, erection at South Weymouth was under the direction of Lieut. G. A. Daniels (CEC) USNR, resident officer in charge of construction. Erection operations were managed for the Harris Structural Steel Co., subcontractor, by Horace (Harry) Stetler, general erection superintendent, while other operations con-

(Continued on page 140)

The simple design and ease of maintaining and servicing CMC equipment are features that mean money in the pockets of owners today. Your nearest CMC distributor is ready to help you get EXTRA SERVICE from your present equipment. Call on him.

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA



The trek of the crew and equipment to Fort Norman.

Section of right-of-way cleared by Baker Bulldozers.

Baker overhead tie rod protects cab and operator against falling timber.

Bakers Clear Right-Of-Way for Pipe Line on Rim of Arctic!

Asphalt to extend and maintain the Alaska Highway, high octane gas for Japan-bound bombers and post-war cargo planes and diesel fuel for power in far north mines, canneries, pulp mills and fisheries will be made available by completion of the 600 mile long Canol pipe line in northern Canada.

This line will bring oil from wells at Fort Norman, Northwest Territory — trading post on the Mackenzie River — to a refinery under construction near Whitehorse, Yukon Territory.

Baker bulldozers are being used to doze trees, brush and rocks, fill gullies, level and grade, and to otherwise clear a right-of-way for the pipe line. This project was made necessary by the war and will pay off after the war, too. It will be unnecessary to haul petroleum products from the United States.

Baker hydraulic bulldozers with their direct lift and full down pressure on the blade are proving ideal for work in the frozen forest and wastelands.

The full weight of the tractor front end can be brought to bear on the blade—tough, frozen sub-arctic soils find their master in the Baker.

Send for Catalog 839.

THE BAKER MFG. CO.
568 Stanford Ave., Springfield, Ill.

Awarded the Army-Navy "E" flag for proficiency in production.

BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

(Continued from page 138)

nected with the construction of the hangar, including assembly of truss sections on the ground, were under the supervision of Lovell H. Smith, general superintendent for the joint contractors, the Sawyer Construction Co. and the V. Barletta Co. of Boston. Carl Olson was engineer for the general contractors.

PART 2 OF THIS ARTICLE, scheduled for publication in March, will tell how a Gulf Coast hangar when half erected withstood hurricane winds exceeding 100 m.p.h.

★ ★ ★

Three-Hinged Concrete Arch Ribs

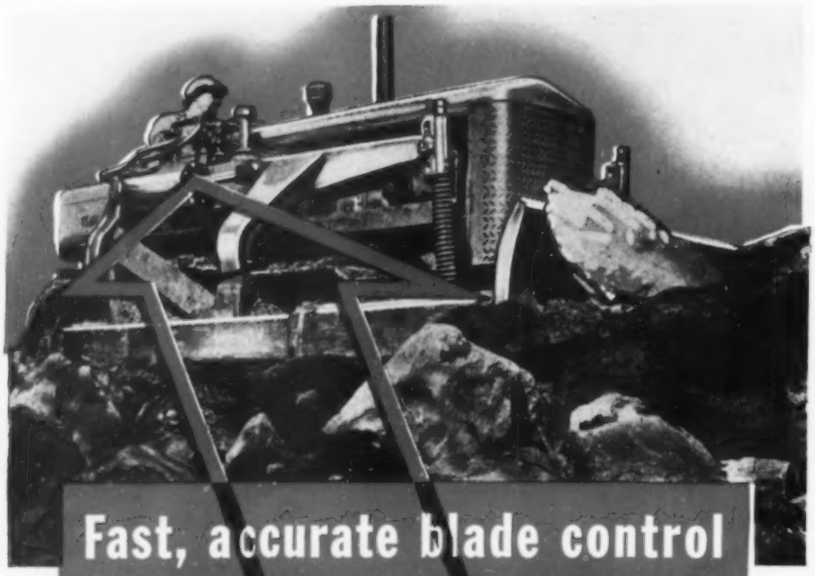
(Continued from page 71)

place. Graphite grease is used in the haunch hinges to facilitate rotation.

Nine arch ribs were needed for the building, 126 ft. in length, comprising 8 bays 15 ft. 8 in. long between rib centers. On the level wooden casting platform, the contractors laid out forms for the fabrication of nine complete ribs. Hinge plates were fitted on the pipe pin and anchor bolts of the center hinge before the two halves of each rib were cast. At the end of a required 18-day curing period, hinge plates were removed to permit a crane to pick up and set half a rib at a time. The center hinge was reassembled in the air.

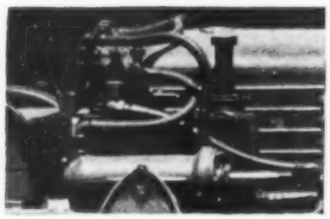
Direction

Construction of the arch roof auditorium-gymnasium building is a relatively small item in an $80,000,000 program completed for the Naval Air Training Center in the last 3 years by Brown-Bellows-Columbia, contractors, and Robert & Co., engineer-architects, under the direction of the Bureau of Yards and Docks, for which Capt. George R. Brooks (CEC) USN is officer in charge of construction. S. H. Wilde is general manager for the contractor group, made up of Brown & Root, Inc., Houston, Tex.; W. S. Bellows Construction Co., Houston, and Columbia Construction Co., Oakland, Calif. For the engineer-architects, Robert & Co., Inc., Atlanta, Ga., H. W. Howarth is manager on the project.



Fast, accurate blade control with the sensitive, dependable Heil Hydraulic System

on Heil Bulldozers and Trailbuilders for Cletrac Tractors . . .



Troublefree Hydraulic System

Large diameter cylinders, permitting use of low hydraulic operating pressures. Piston rods are chromium-plated to avoid rusting and subsequent pitting.

Below:
Heil Hydraulic Pump, equipped with roller bearings for longer life. (Regularly rear-mounted — may be front-mounted.)

Efficient operation depends on instant response to a touch on the controls. That's what your operator gets with the Heil hydraulic system — whether it's rough, tough going among rocks and stumps, or he's doing a "smoothy" on landscape finishing. And he *keeps on getting* that same speed and accuracy, because this is the next thing to a perfect leak-proof unit. It stays in adjustment, gives minimum trouble through a long, hard life. Perfect balance, full visibility, many other Heil features assure you of full loads and bigger profits. Equip with Heil. Write for bulletins.

R-20

SEE YOUR CLETRAC TRACTOR DEALER

ARMY E NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Army Warehouse

(Continued from page 52)

knee-braced end panels which extend at an angle below the bottom flange and increase the beam depth at the end to 50 to 55 in. Upper flanges of the beams rest on the top chords of the main girders, and the end posts of abutting beams are connected by bolting through a built-up web section of the girders. Split-ring connectors are used in this beam-to-girder connection, the only field joint in which timber connectors were required.

Structural Erection

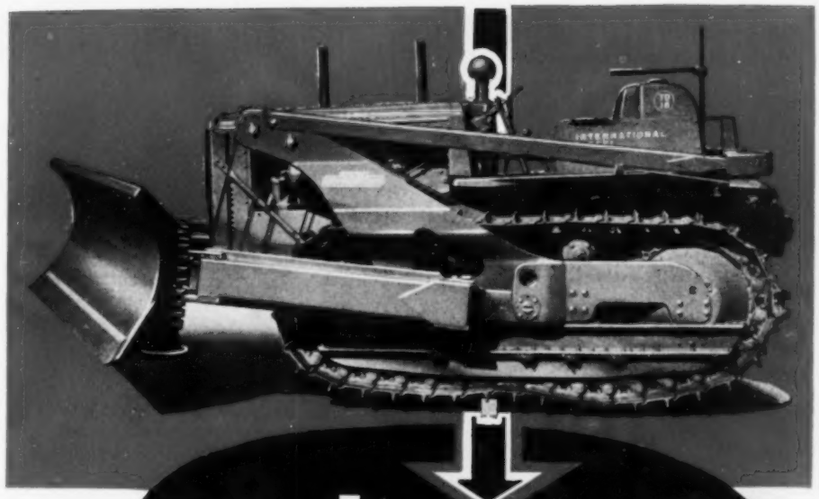
All structural parts were accurately shop-fabricated to exact dimensions, and the bolted connections went together with ease and speed. A Lorain crawler crane (65-ft. boom) and a crew of eight men, comprising six structural workmen, one foreman and a crane operator, took care of erection as fast as the timber members could be delivered to the job.

Ordinary erection procedure called for assembling a main girder and one or two supporting columns, as required, before raising the assembled unit into vertical position on the concrete pedestals. An assembled unit of a girder and two columns weighed less than 2 tons. Total structural timber (girders, beams and columns) for framing the 156x2,162-ft. warehouse amounted to a little less than 600 tons.

Timber Design Procedure

Timber members for each job are designed to meet the requirements of the structure. Shop and assembly drawings are prepared, as with a structural steel design, and all members are shop-fabricated and shop-marked to correspond with the erection drawings. In addition, before leaving the factory, all members are shop-painted with a fire-retardant oil paint. Structurally, a built-up laminated timber beam of the type used in the warehouse addition is statically indeterminate. In designing, however, it is treated as a double Warren truss. The chords, of laminated lumber, are glued, nailed and doweled to the plywood web and to each other. End panels have a diagonal member on each side designed to take all vertical and horizontal end shear. These diagonals are glued, nailed and bolted at each end of the girder and

(Continued on page 142)



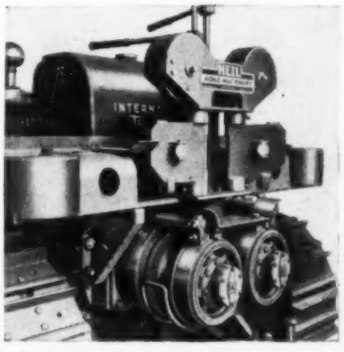
Balance

...assures ease of control and efficient operation

with the Heil Co.'s new

Cable Dozers

for International Harvester TracTracTors



Equipped with simple, fast-operating, troublefree Heil Cable Power Control Unit

Ample safety factor. Smooth-operating brake and clutch assemblies that eliminate shocks and jerks. Large drums that run cool. Sheaves designed to reduce wear on cables.

The full power of your tractor drives on the blade — moving more "pay dirt" with each load — and there is no nosing down or rearing up, because the center of gravity has not been changed by the addition of the Cable Dozer. This is just one example of the thorough engineering which has accomplished perfect teamwork all along the line. Note operator's unobstructed view — convenience of controls (adjustable to his reach) — rugged side member construction. Send for bulletin describing many other features which assure you of cleaner, faster dirt moving at lower cost. R-19

SEE YOUR INTERNATIONAL TRACTRACTOR DEALER

ARMY E NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

STAUNCH
DEPENDABILITY

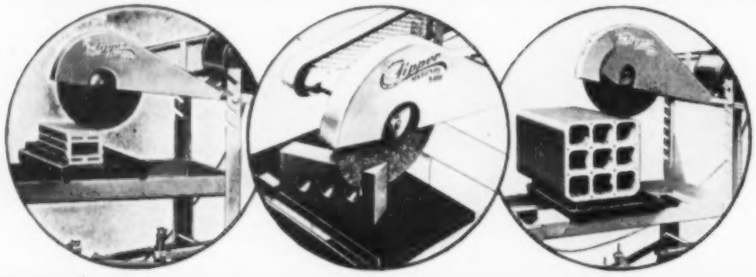
Through demonstrated dependability servicemen have come to place implicit confidence in the ever faithful and efficient American Red Cross.

Through long demonstrated performance too, bucket users have come to depend with confidence upon Owen Buckets as the most rugged and dependable units available to meet their various important requirements.

THE OWEN BUCKET CO.
6020 Breakwater Ave., Cleveland, O.
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.

OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

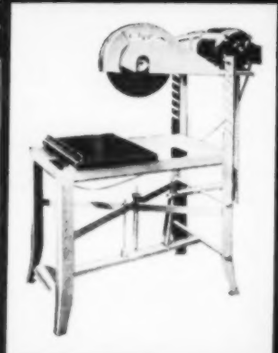
CLIPPER MASONRY SAWS
7 MODELS—A DESIGN FOR EVERY JOB!



A Special Shape or Shorter Length Need Only Be As Far Away As Your Clipper

Clipper Masonry Saws have become a familiar sight on construction work all over the country, because they really do a job

The basic feature of Clipper's is the new multiple cutting principle . . . a method developed especially for Masonry Materials. You can be sure to cut with the fastest possible cutting speed and to obtain the longest blade life.



CLIPPER MFG. COMPANY
1002 S. Van Deventer • St. Louis, Mo.

(Continued from page 141)

are provided with split-ring connectors where the design requires.

Columns, girders and beams used in the warehouse are only a few of many applications of laminated I- and H-shaped timber members. This type of fabricated member has been applied in the construction of craneways, pipe supports, monorail supports, sawtooth girders, footbridges and other structural items, as well as in lintels and purlins. During the last year, something like 150 buildings have been erected with laminated I- and H-section timber members, as designed and fabricated by Timbeam, Inc., Detroit.

Roof Framing

For the Army warehouse addition, a secondary roof framing of 2x10-in. joists on 30-in. centers was placed on the longitudinal beams, spaced about 15 ft., c. to c. To save lumber, the joists were sheathed with 1x6-in. strips on 12-in. centers, and this open sheathing was covered with 25/32-in. Temseal insulating board. Over the insulating board, a roofing subcontractor applied three-ply built-up composition roofing, laid in hot pitch.

Walls of the building are constructed of 8-in. concrete block. Along the lengthwise exterior wall, where an outside canopy over a freight-handling platform is supported from the interior timber framing, special built-up laminated timber columns of triangular shape flaring toward the top (for greater stiffness) were erected at 20-ft. centers, intermediate columns being placed midway between structural columns supporting the transverse girders of the building frame.

Personnel

The warehouse addition was designed and constructed for the Army Service Forces by the Cincinnati District, Ohio River Division, Corps of Engineers, U. S. Army, with Timbeam, Inc., Detroit, Mich., cooperating in the design of the structural frame. Col. C. L. Hall is division engineer, Ohio River Division, and Lt. Col. Ralph J. Griffin is district engineer, Cincinnati District, with R. C. Vogt as principal engineer. Construction was under the immediate direction of Maj. Frank W. Salfingere, area engineer, with Maj. W. H. Howard as assistant area engineer, and Carl H. Aiken, Jr., as chief inspector.

For Robert H. Evans & Co., contractor, Columbus, Harry H. Cashell, superintendent, directed construction of the building. Timbeam, Inc., supplied the structural timber members.

Built to set the pace

and HOLD IT!

After more than a decade of duty in all types of construction equipment on the kind of jobs that really put power "through the wringer"—this fact about Cummins Dependable Diesels stands out like an unbroken window in Berlin: They are built to set the pace in dependability, economy and speed —*and hold it!* Day and night . . . until the job is wrapped up and delivered.

CUMMINS ENGINE COMPANY

Columbus, Indiana

THERE'S EXTRA PERFORMANCE IN EVERY ATTACHMENT with

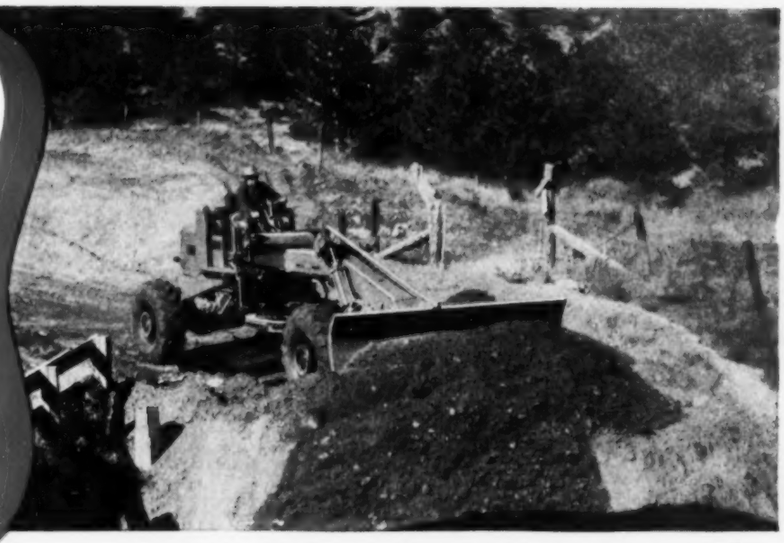
All-Wheel Drive and All-Wheel Steer make it possible to mount an attachment ahead of or behind the "99-M" without sacrifice of operating efficiency or machine control. When the entire weight of the rear end of the machine is transferred to such a rear-mounted attachment as the Roller, the "99-M" drives and steers with its front end. When the entire weight of the front end is transferred to such a front-mounted attachment as the Bulldozer, the "99-M" drives and steers with its rear end. An ordinary motor grader would be helpless under such conditions.

In addition to making it possible to mount on the "99-M" attachments that could not be mounted on ordinary motor graders, All-Wheel Drive and All-Wheel Steer provide traction and maneuverability that make every attachment just that much more effective on the "99-M" than it would be on other motor graders.

THE AUSTIN-WESTERN ROAD MACHINERY CO., AURORA, ILLINOIS, U. S. A.

All-Wheel Drive and All-Wheel Steer provide the traction and maneuverability needed for effective plowing and winging under any and all conditions.

ALL-WHEEL *Drive* ALL-WHEEL *Steer*



↑ Bulldozing over the edge of a fill. All-Wheel Drive provides maximum traction; All-Wheel Steer provides exceptional maneuverability.

…ghway departments find the Loader unequalled … ditch and shoulder maintenance. Contractors …d many uses for the Loader on work involving …llow excavation. ↑

…urifying tough blacktop. The alloy tooth points → …e removable; the tooth shanks are adjustable. …e block folds up to give unusual throat room.

…e Roller has many uses on construction and re…nstruction work, and on many materials, includ…g gravel, blacktop and soil cement. ↓

BUILDERS OF ROAD MACHINERY

Austin-Western

SINCE 1859

BUY MORE WAR BONDS

The Austin-Western line includes POWER GRADERS, ROAD GRADERS, ELEVATING GRADERS, ROAD ROLLERS, SHOVELS AND CRANES, STREET SWEEPERS, DUMP CARS, TRAIL CARS AND A COMPLETE LINE OF ROCK CRUSHING AND SCREENING PLANTS.

Advertisers in this issue

WHERE TO BUY

'RAMSEY'
3-Speed . . . ALL-STEEL
HAND WINCH

2 Sizes

5 - ton capacity — 135 - lb. spools, 325' of ½" cable $65
3 - ton cap'y — 75-lb. spools, 150' of ½" cable $60

Write for circular and name of nearest dealer. A few territories are open for live distributors

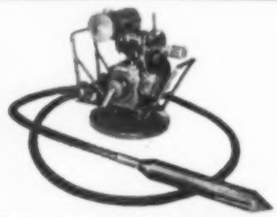
POWER FOR HEAVY LOADS, SPEED FOR LIGHT LOADS. Gear Ratios: 25 : 1, 4 : 1, 1 : 1.

Manufactured by
RAMSEY MACHINERY CO.
1628 N. W. THURMAN ST., PORTLAND, ORE.

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write For Job Estimate and 32 page Catalog
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
36-36 11th St., Long Island City, N. Y.
Tel. HAnsides 6-8600
Branch: Third Avenue & Adams St., Gary, Indiana
Telephone: Gary 23983

STERLING HOISTS
STERLING QUALITY
YOU'LL GET BETTER RESULTS WITH STERLING
Write for Literature
Simple, Dependable, Rugged—that's why Sterling Electric, Pneumatic and Light Plants are the choice of leading construction and industrial users everywhere.

STERLING MACHINERY CORP.
405-13 Southwest Blvd., Kansas City, Mo.



Concrete VIBRATORS and Grinders
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

Adams Co., J. D. 81
Aircraft & Diesel Equip. Corp. 88
Allis-Chalmers Mfg. Co. 131
American Cable Division
American Chain & Cable Co. ..... 3rd Cover
American Chain & Cable Co.
(American Cable Division) ..... 3rd Cover
(Hazard Wire Rope Div.) 16, 17
American Hoist & Derrick Co. 102
Ames Baldwin Wyoming Co. 130
Armco Drainage Products Assn. 125
Armstrong Bros. Tool Co. 88
Associated General Contrs. of America, Inc., The 36
Athey Truss Wheel Co. 123
Atlas Powder Co. 42
Austin-Western Road Machinery Co., The 144, 145

Baker Mfg. Co., The 139
Barber-Greene Co. 113
Barco Manufacturing Co. 26
Bethlehem Steel Co. 127
Blackhawk Mfg. Co. 31
Blaw-Knox Div. of Blaw-Knox Co. 12, 13
Buckeye Traction Ditcher Co., The 11, 135
Bucyrus-Erie Co. 117
Buda Company, The 92
Byers Machine Co. 106

Caterpillar Tractor Co. 119
C. H. & E. Mfg. Co. 94
Chain Belt Company 33
Cleaver-Brooks Co. 114
Cleveland Tractor Co. 74, 75
Cleveland Trencher Co., The 124
Clipper Mfg. Co. 142
Clyde Iron Works, Inc. 87
Coast Metals, Inc. 96
Complete Machinery & Equip. Co., Inc. 146
Consolidated Steel Corp. 39
Construction Machinery Co. 138
Contractors Pump Bureau 124
Cummins Engine Co. 143

Dixie Cup Company 90
Dixon Valve & Coupling Co. 94
Duff-Norton Mfg. Co. 116

Economy Forms Corp. 15
Electric Tamper & Equip. Co. 128
Euclid Road Machy. Co., The 7

SEARCHLIGHT SECTION

POSITION VACANT

A MIDWEST CONSTRUCTION COMPANY having a first-class paving outfit is desirous of contacting a manager-superintendent for its paving operations. None but the highest type man capable of bidding and completing a project in its entirety need app'y. Construction Methods, P-140, 520 N. Michigan Ave., Chicago 11, Ill.

Are the Cars You Want Listed Here?

150, Hopper, Double, 50-Ton
45, Hopper, Side-Discharge, 50-Ton
25, Ballast, Composite, 50-Ton
150, Box, 36-Ft., 40-Ton; Steel Ends
16, Refrigerator, 36-Ft., 30-Ton
100, Refrigerator, 40-Ft., 40-Ton
55, Gondola, Composite 36-Ft. & 40-Ft., 40-Ton
2, Dump, Western, Automatic, 30-Yd., 40-Ton
6, Dump, Magor Automatic, 23-Yd., 50-Ton
8, Dump, Western, Automatic, 27-Yd., 40-Ton
2, Dump, Western, Automatic, 27-Yd., 50-Ton
25, Dump, Magor, Automatic, 30-Yd., 50-ton
10, Dump, Koppel, Side-Discharge, 24-Yd., 30-Ton
25, Flat, 40 Ft. 40-ton

Locomotives and Passenger Cars too!

IRON & STEEL PRODUCTS, INC.
20 years' experience
13458 S. Brainard Ave., CHICAGO 33, ILLINOIS
"ANYTHING containing IRON or STEEL"

8 — Allis Chalmers Speed-Ace
TRACTOR WAGONS — 7½-yd. Cap.
In good condition—Write for illustrated bulletin!
IRON & STEEL PRODUCTS, INC.
13458 S. Brainard Ave., Chicago 33, Illinois.
"Anything containing IRON or STEEL"

WANTED TO BUY
12 20-yard second-hand air dump cars. Communicate with the undersigned company indicating price and also stating where cars can be inspected.
THE MILWAUKEE ELECTRIC RAILWAY & TRANSPORT CO.
FRED V. BENZ—Purchasing Agent
410 Public Service Building,
Milwaukee 1, Wisconsin

Firestone Tire & Rubber Co. 97
Foote Company, Inc. 37

Gatke Corporation 80
General Electric Company 34
General Excavator Co. 38
General Motors Corp.
(Electro-Motive Div.) 121
(Truck Div.) 84
Goodrich Co., B. F. 28
Goodyear Tire & Rubber Co. 46
Gorman-Rupp Co. 133
Gray Co., Inc. 112
Griffin Wellpoint Corp. 99
Gulf Refining Co. 91
Gustin-Bacon Mfg. Co. 24

Haiss Mfg. Co., Inc., Geo. 132
Harnischfeger Corp. 25
Hazard Wire Rope Division,
American Chain & Cable Co. 16, 17
Heil Company, The 140, 141
Hercules Co., The 38
Hetherington & Berner, Inc. 124

Independent Pneumatic Tool Co. 8, 9
Industrial Brownhoist Corp. 136
Ingersoll Steel & Disc. Div.,
Borg-Warner Corp. 86
Inland Steel Co. ..... 2nd Cover
Insley Manufacturing Corp. 126
International Harvester Co., Inc. 115
Iowa Manufacturing Co. 29
Iron & Steel Products, Inc. 146

Jaeger Machine Co., The 45

Koehring Company, The 111

Laughlin Co., The Thomas 100
Le Roi Company 128
Leschen & Sons Rope Co., A. 14
Le Tourneau, Inc., R. G. 27
Lima Locomotive Works, Inc. 43
Lincoln Electric Co., The 22, 23
Link-Belt Speeder Corp. 89
Lone Star Cement Corp. 5
Lowell Wrench Co. 86
Lubricate Division,
Fiske Bros. Refining Co. 107
Lufkin Rule Co., The 80

Macwhyte Co. 20
Mall Tool Co. 112
Marmon-Herrington Co., Inc. 106
Master Vibrator Co., The 21
McGraw-Hill Book Co., Inc. 120, 138
Meili-Blumberg Corp. 96
Mercer-Robinson Co., Inc. 133
Michigan Power Shovel Co. 95
Milwaukee Elec. Rwy. & Transport Co. 146
Moretrench Corp. 114

National Carbide Corp. 84
Northwest Engineering Co. 19
Novo Engine Co. 122

Oakite Products, Inc. 102
Osgood Co., The 38
Owen Bucket Co., The 142

Page Engineering Co. 129
Parsons Co., The 103
Porter-Cable Machine Co. 108

Ramsey Machinery Co. 146
Ransome Machinery Co. 101
Raybestos Division, The,
Raybestos-Manhattan, Inc. 118
Riddell Corp., W. A. 110
Rogers Bros. Corp. 130

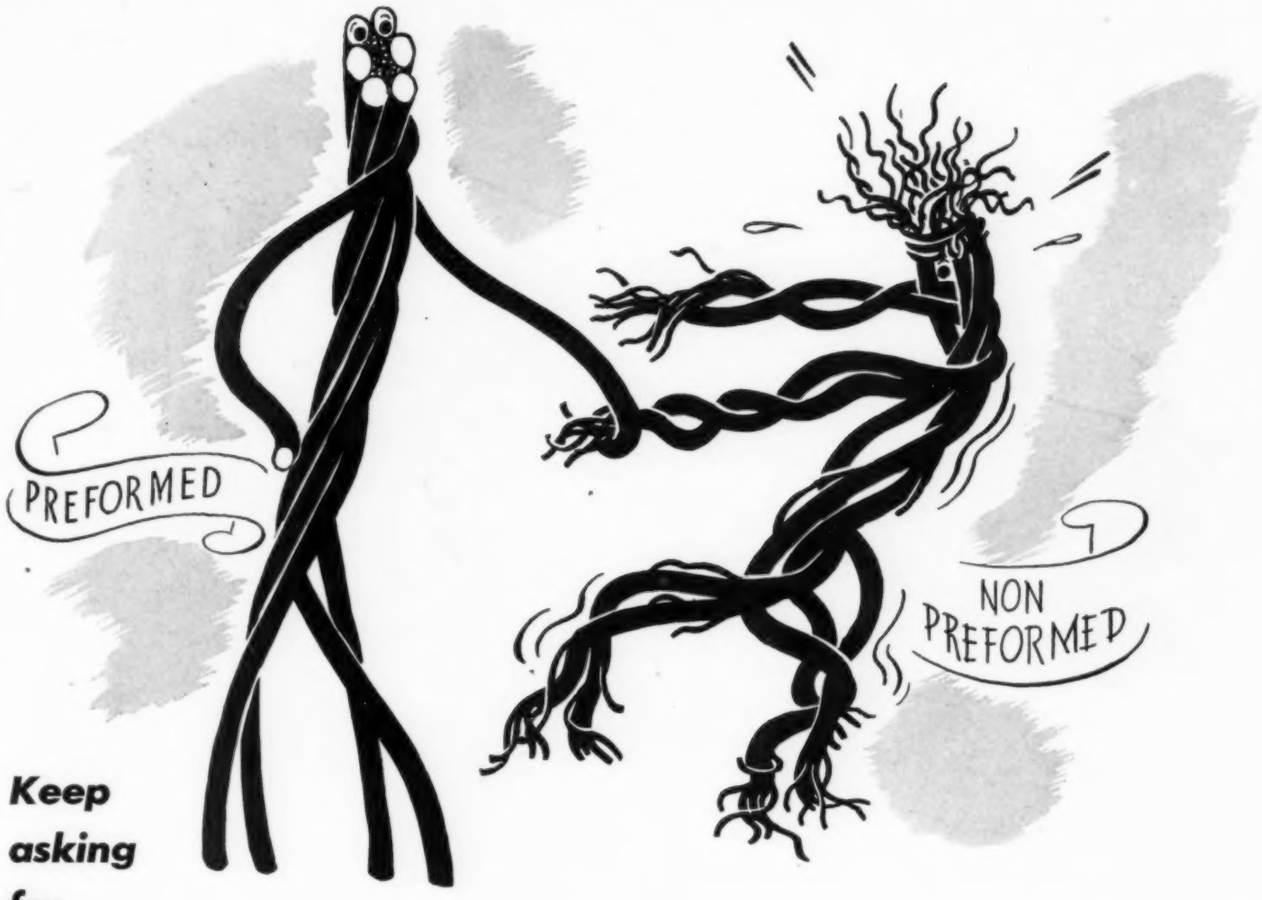
Schramm, Inc. 10
Seaman Motors 98
Searchlight Section 146
Skilsaw, Inc. 105
Smith Engineering Works 6
Sonoco Products Co. 120
Sterling Machinery Corp. 93, 146
Sterling Wheelbarrow Co. 94

Templeton, Kenly & Co. 86
Texas Company, The 18, 109
Thew Shovel Co., The 30
Timber Engineering Co. 41
Timber Structures, Inc. 85
Timken Roller Bearing Co., The 79

Union Iron Works, Inc. 120
Union Steel Products Co. 129
United States Steel Corp., Subsidiaries 82
Universal Atlas Cement Co. 32
Universal Engineering Corp. 44
Universal Road Mach'y Co. 136

Vacuum Concrete, Inc. 35
Viber Company 99
Vulcan Iron Works 88

Wellman Co., S. K., The 40
Wellman Engineering Co., The 104
Wengel Tent & Duck Co., H. 82, 83
White Mfg. Co. 146
Whiteman Mfg. Co. 104
Wisconsin Motors Corp. 134
Wooldridge Mfg. Co. 137
Worthington Pump & Machinery Corp. ..... 101, 132, 4th Cover



Keep asking for

AMERICAN CABLE TRU·LAY PREFORMED WIRE ROPE

● Cranky, non-preformed wire rope is hard stuff to handle. It is so pent-up with strains it tries to throw itself into a kink just to relieve itself of its torsional stresses. **TRU-LAY** Preformed resists the tendency to kink because its wires and strands are at ease, relaxed, composed. It is easier, faster, safer, cheaper, to handle.

Because . . .
it resists kinking!

This is just *one* of the many advantages built into American Cable **TRU-LAY** Preformed—at the mill. Just *one* of the reasons why **TRU-LAY** Preformed wire rope is preferred and specified by so many operators. Specify it for your next line. It will steady your machine production; save you time, and prevent accidents.

No wonder the Armed Forces take so much of our production!

AMERICAN CABLE DIVISION
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Tacoma, San Francisco

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

To Cut Cost of $60,000,000 City Improvement

Behind the Fighting Fronts with

Blue Brutes

Blue Brutes in wartime girdle the globe. Colored olive drab for Army, battleship gray for Navy, they speed the flight of Fortresses from jungle air fields, help keep shell-shocked roads in occupied territories open to military traffic, and help build cantonments in the Arctic. On the Alcan highway, in Australia, on the Mediterranean fronts -- and in hundreds of Army camps, Navy yards, air bases and ordnance plants here at home — Blue Brutes help the men who fight for our future. Your nearest **distributor is listed on page 132.**

You'll want to know now what Blue Brutes can do, because some day you'll be bidding on jobs like this one:

A post-war development program for Portland, Ore., involving three new bridges, a complete new system of "thruways", a $10,350,000 sewage disposal plant, 6 grade school buildings, railroad depot, etc . . . Expenditure: $60,000,000 in 2 years for construction alone.

If every new compressor and air tool you buy saves only a fraction of a cent per foot, they'd still be worth big money on jobs like that.

Worthington Blue Brute compressors, like the one shown here, cut costs because they're made for easier breathing. Impact-free Feather Valves* which give Blue Brutes the nearest mechanical approach to human breathing, have Nature's simple strength.

You'll find a model of Blue Brute for *any* compressed air construction job when this war's over. Portable or semi-portable. Diesel, gasolene or electric-driven. And Blue Brute Rock Drills and Air Tools, which use less air, will help you get more worth from air delivered.

So, when you're figuring costs on that big job of tomorrow, bid with Blue Brutes in mind. They'll back the bid with what it takes to keep costs down. And that's your money's worth.

*REG. U. S. PAT. OFF.

IC-44

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Harrison, N. J. Holyoke Compressor and Air Tool Department, Holyoke, Massachusetts